ELECTRICAL TIMES

THURSDAY
18 JUNE
1953
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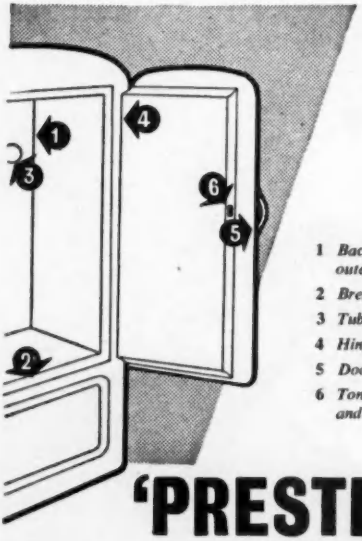

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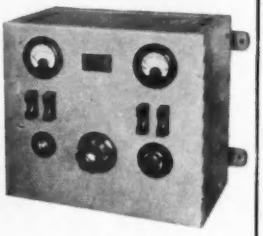

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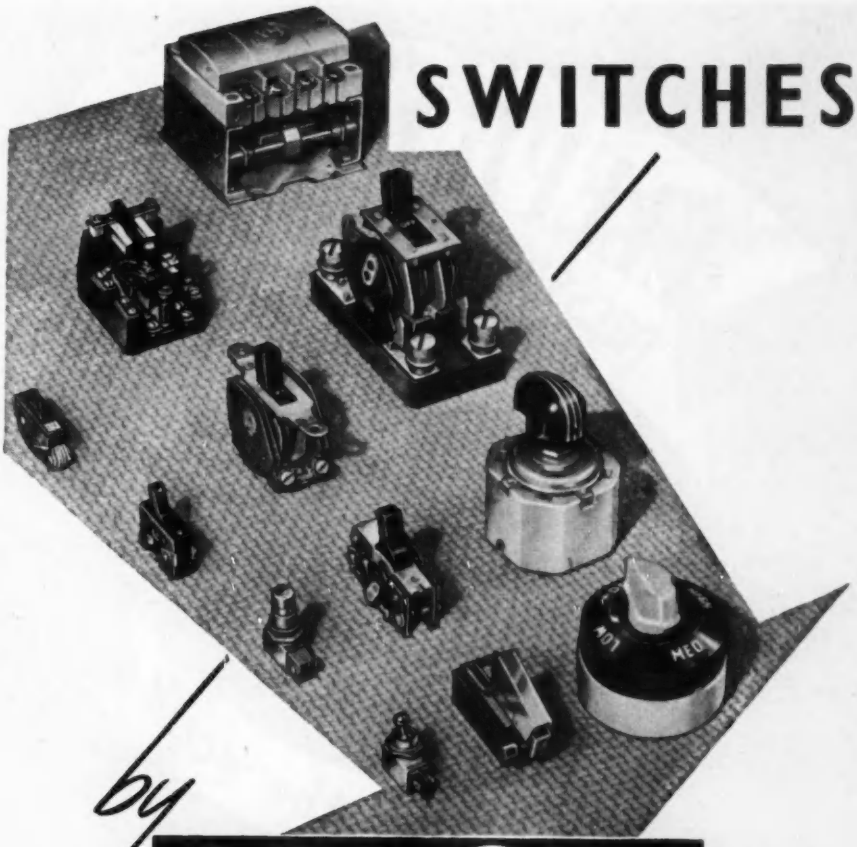

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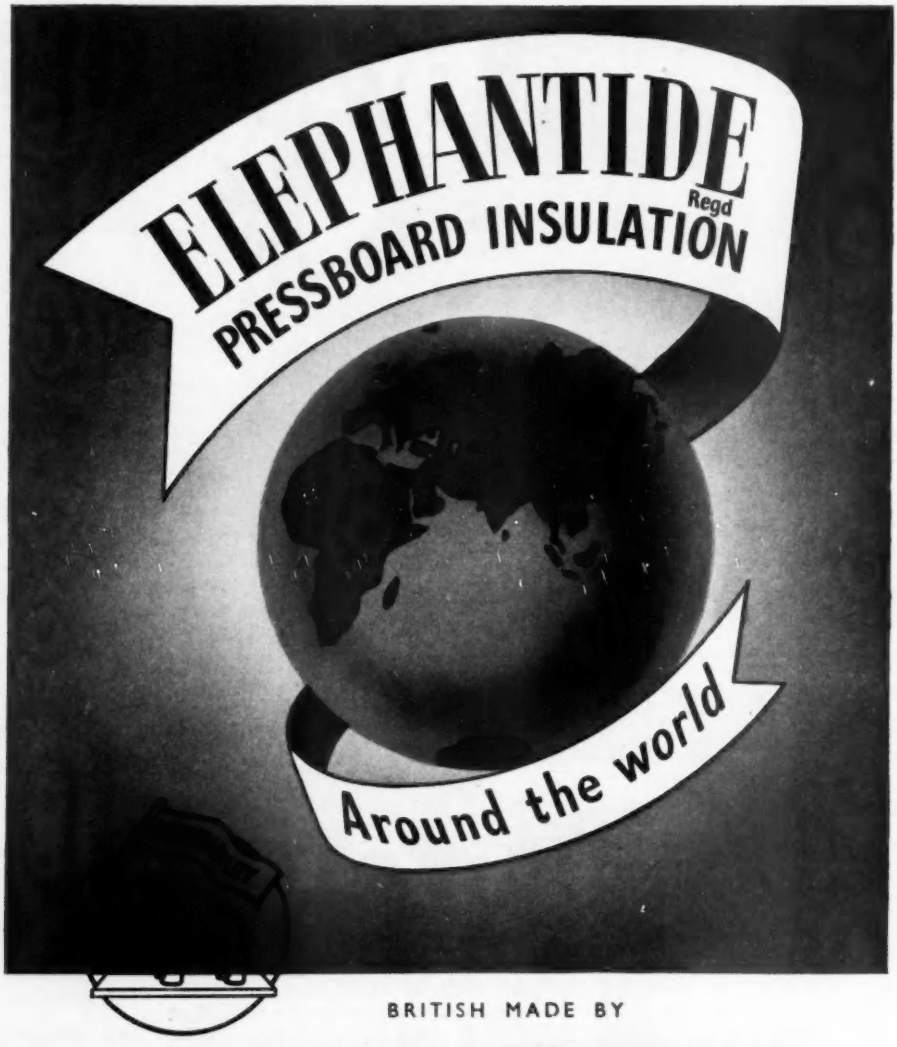

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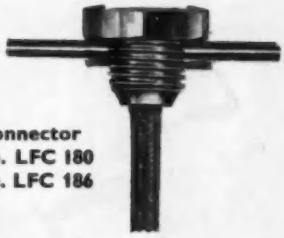
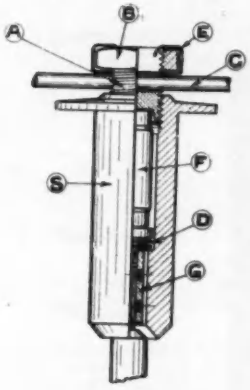
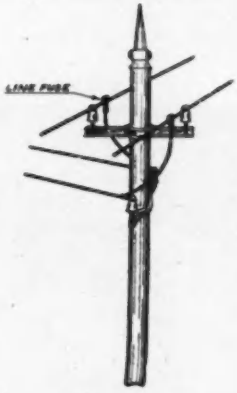


Connector
No. LFC 180
No. LFC 186



Line Fuse
Detail Section



Connecting
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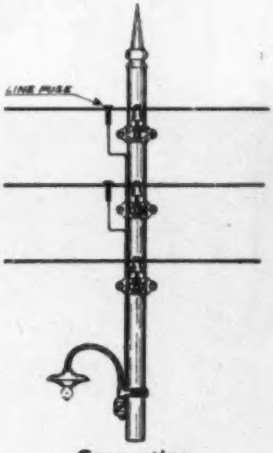
of Service



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This connector increases reliability, because service mains, etc., are fused where connected to main conductors, thus any fault leaves the main conductors unaffected

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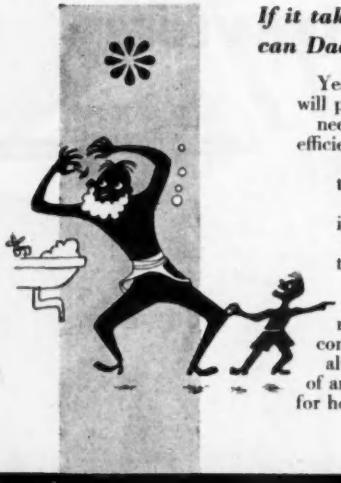
Current Hot Water Problems



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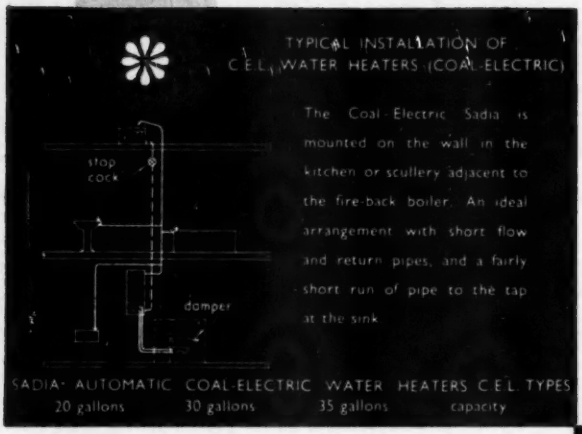
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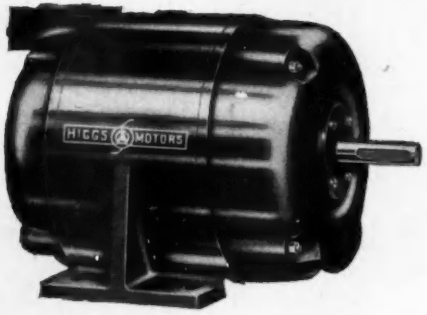

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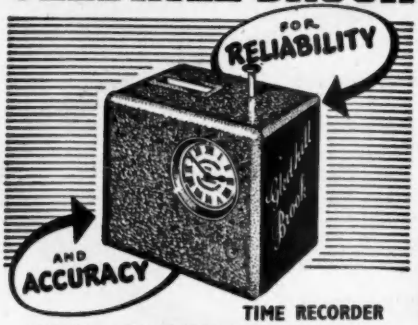

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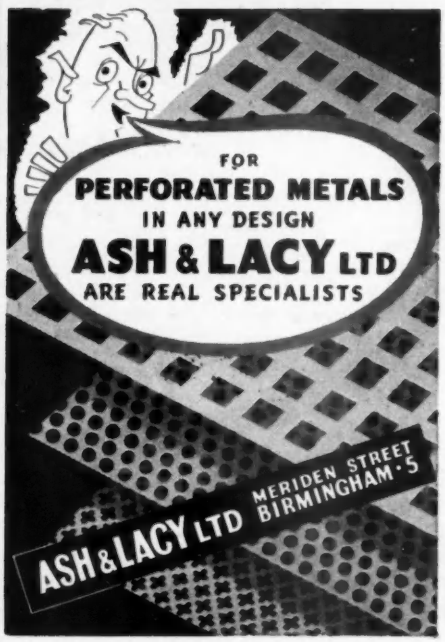

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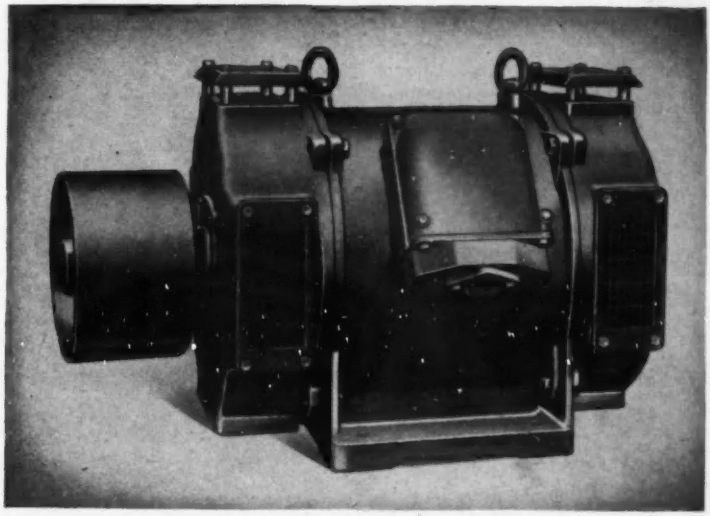

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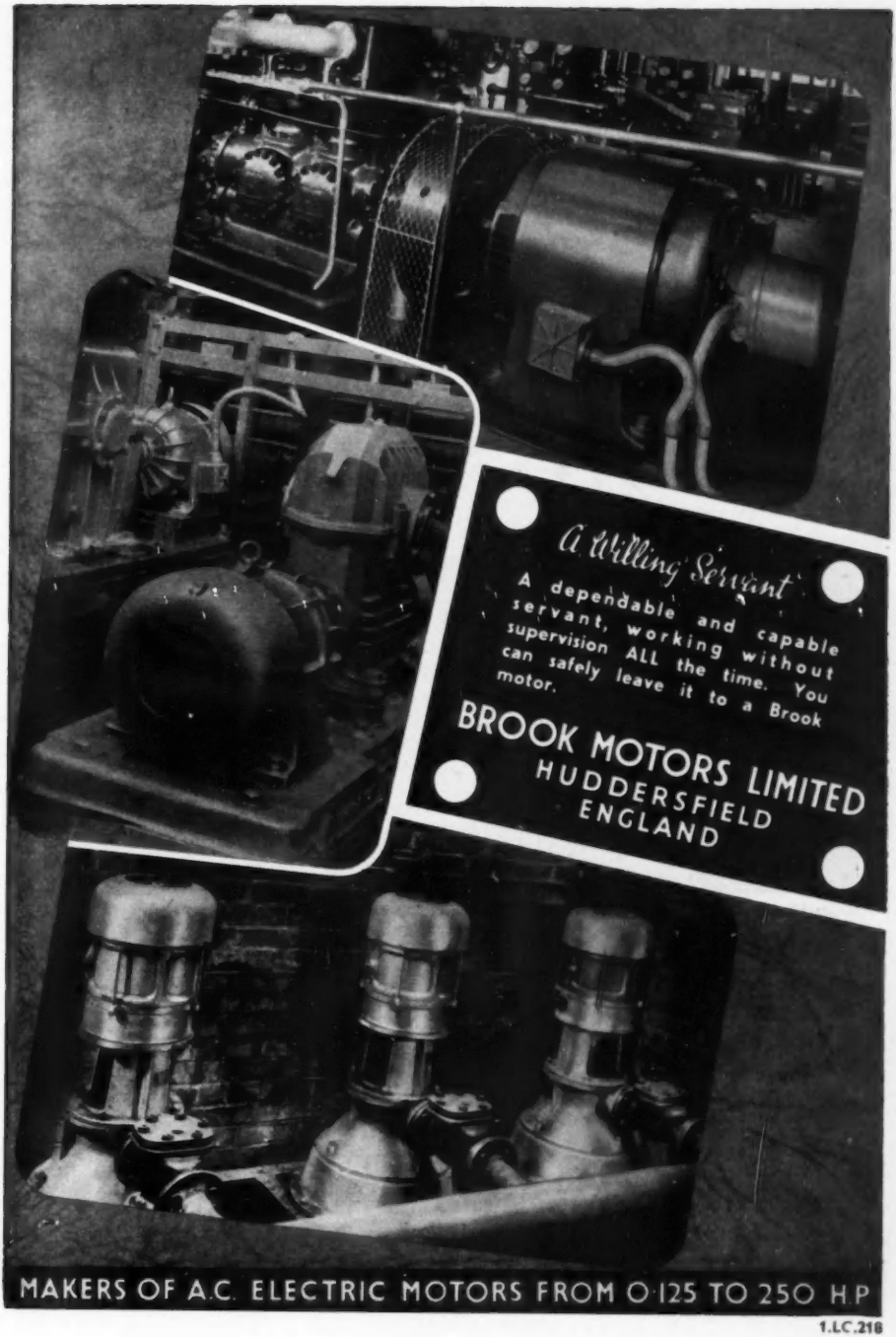
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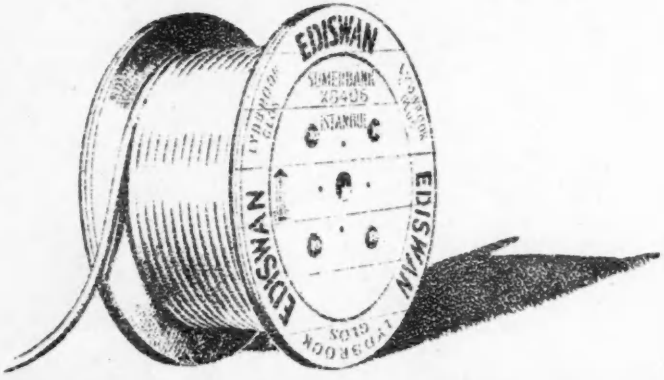

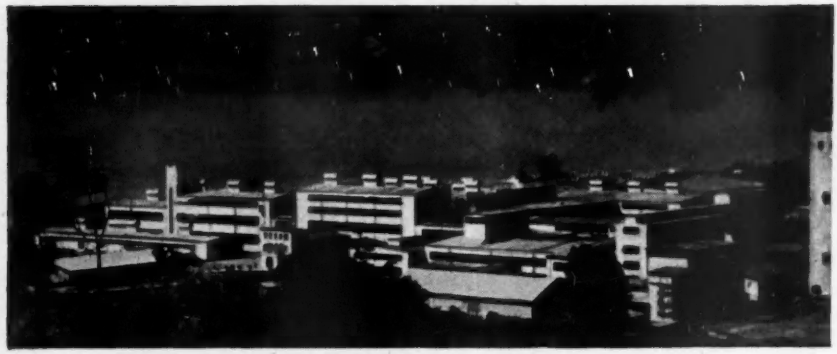

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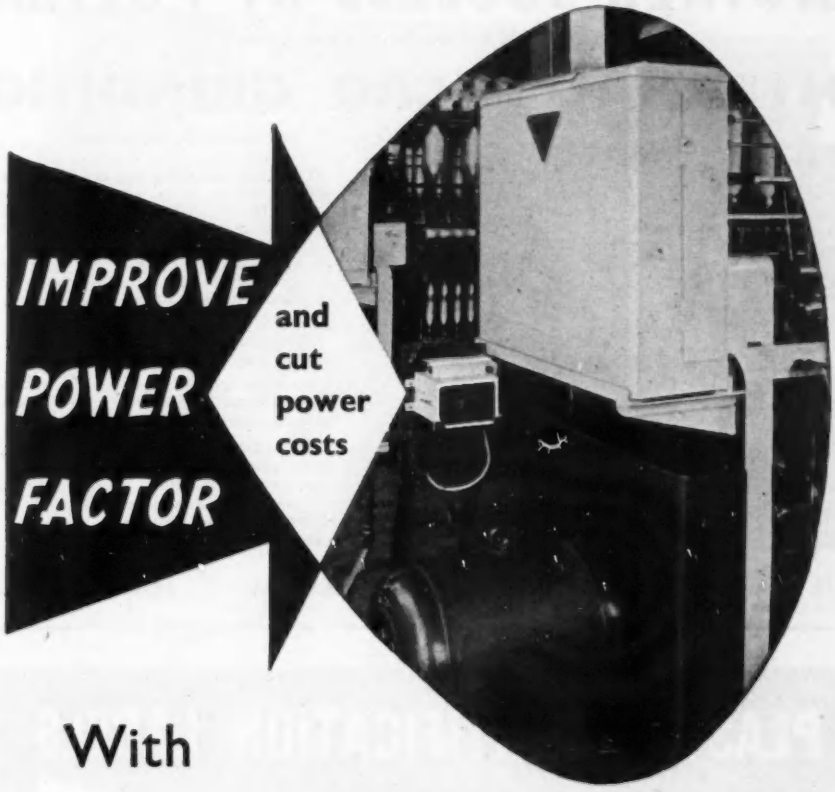

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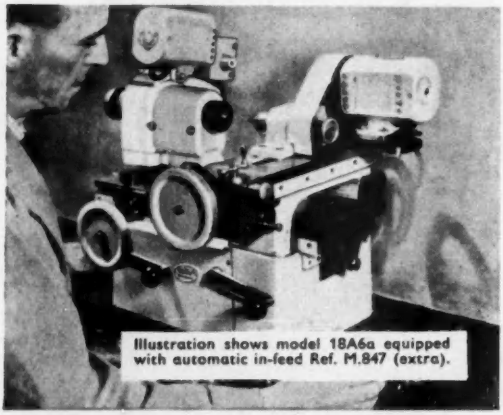

Illustration shows model 18A6a equipped with automatic in-feed Ref. M.847 (extra).

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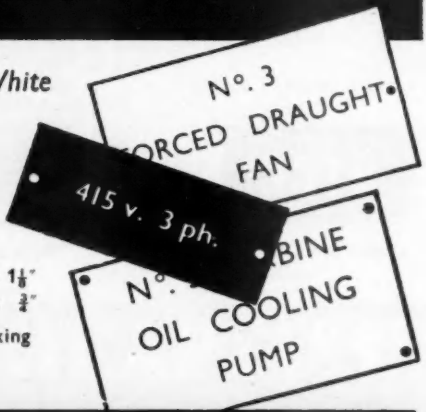

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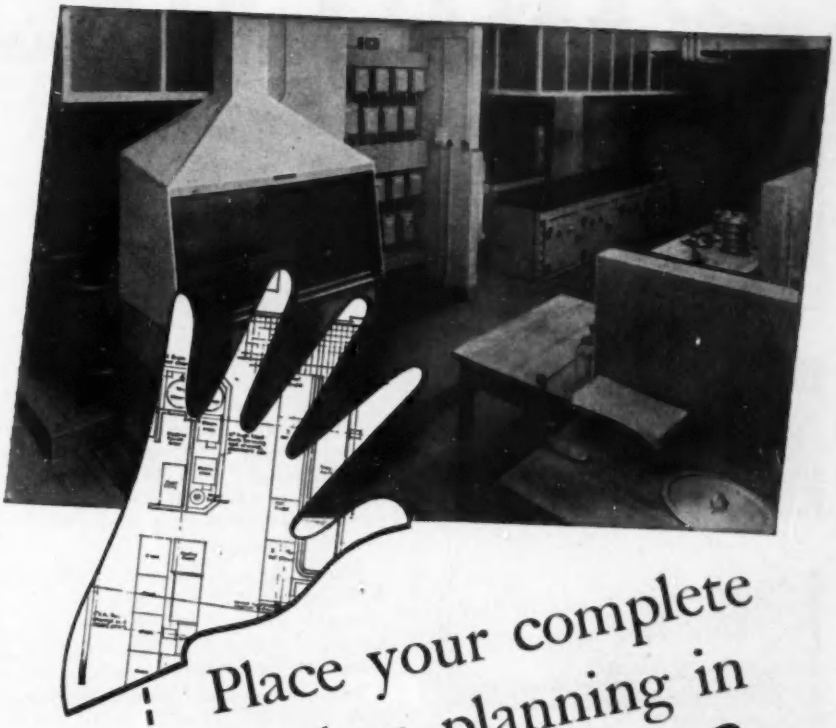

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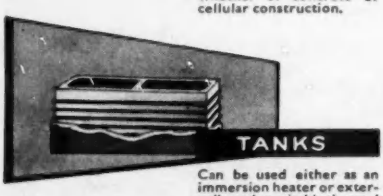
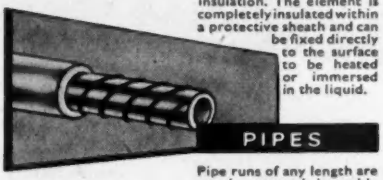
In all types of existing buildings Pyrotenax Warming Cables may be suspended from the roof structures or incorporated in ceilings.

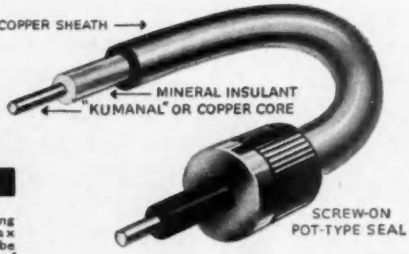
In new buildings the cables can be laid in the floors whether of concrete or cellular construction.



Can be used either as an immersion heater or externally under suitable thermal insulation. The element is completely insulated within a protective sheath and can be fixed directly to the surface to be heated or immersed in the liquid.



Pipe runs of any length are evenly warmed by cable wound spirally around the pipe under the lagging.



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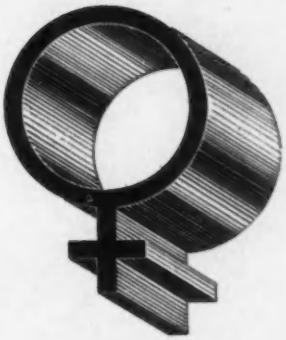

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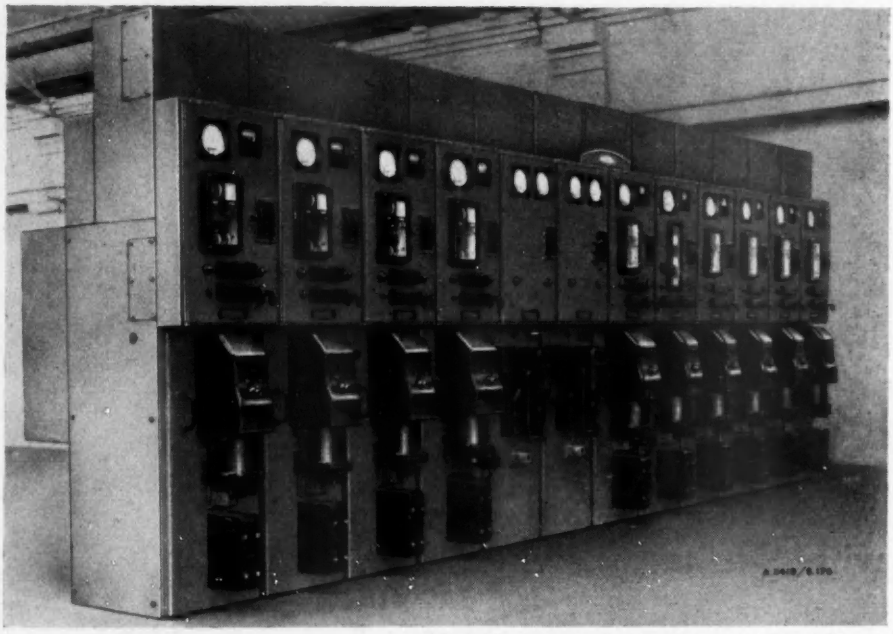

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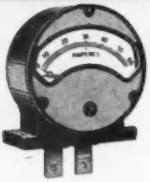

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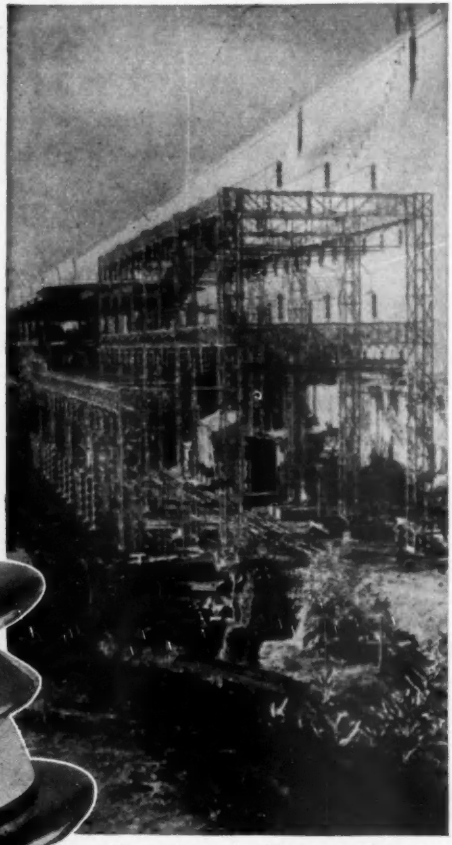

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SP 82

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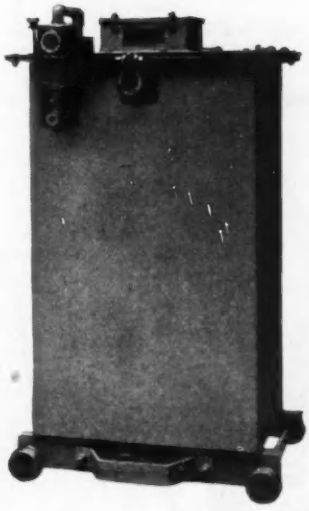

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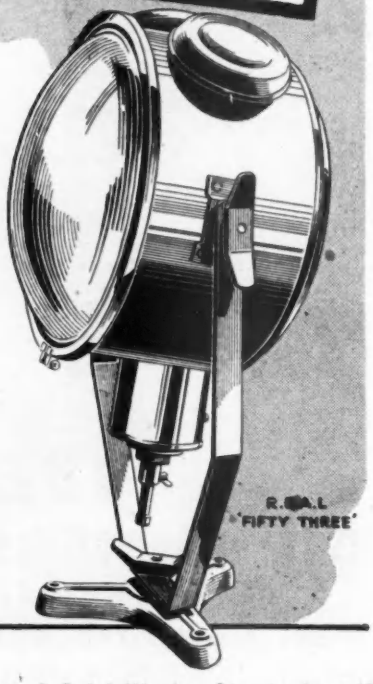

P.S. *Quite a number of engineers insist on R.E.A.L.*

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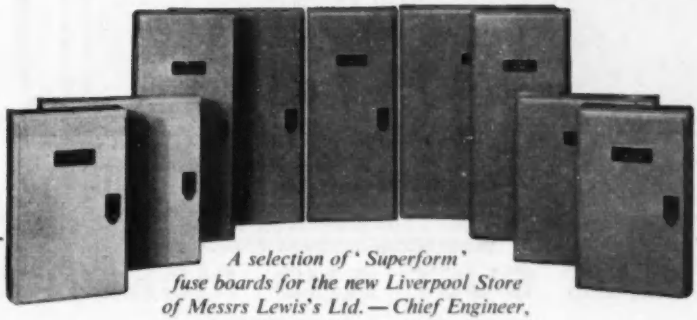
Distribution Fuse Boards



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F.12

See the English Electric advertisement for Transformers which appears on page 63 of this issue

FLUE DUST AND RIDDLINGS

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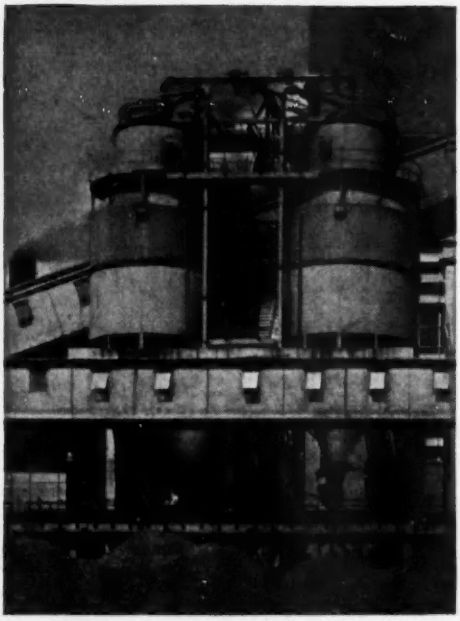

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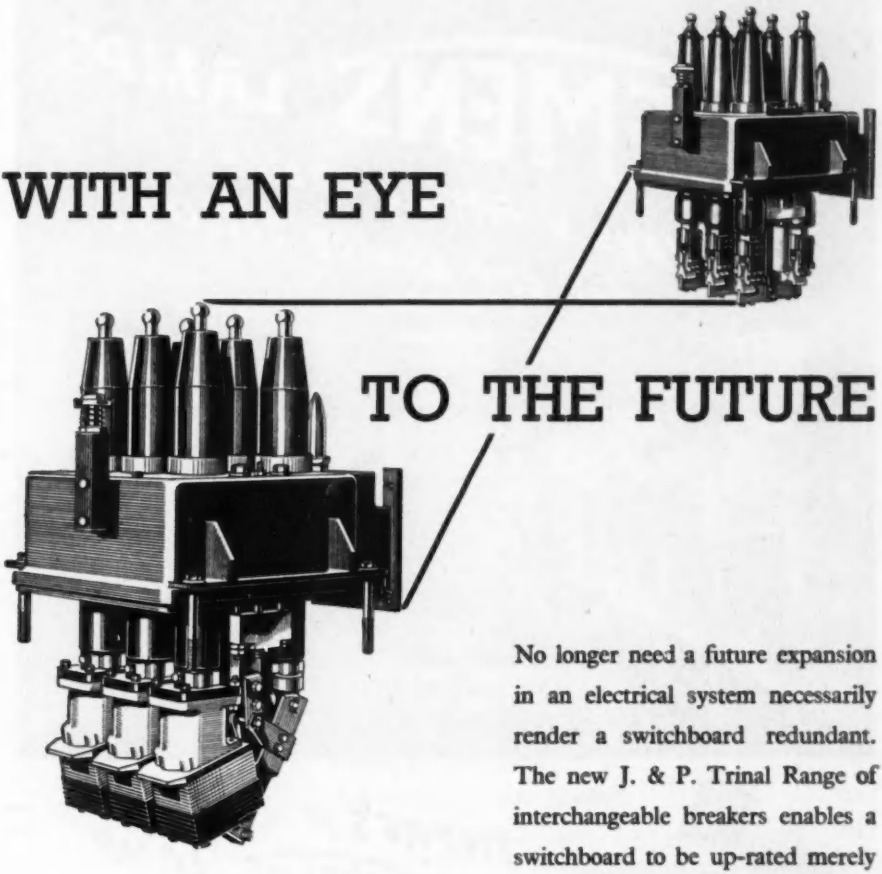
WITH AN EYE TO THE FUTURE



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ELECTRICAL TIMES

Volume 123 No. 3215 18 JUNE, 1953

PUBLISHED EVERY THURSDAY

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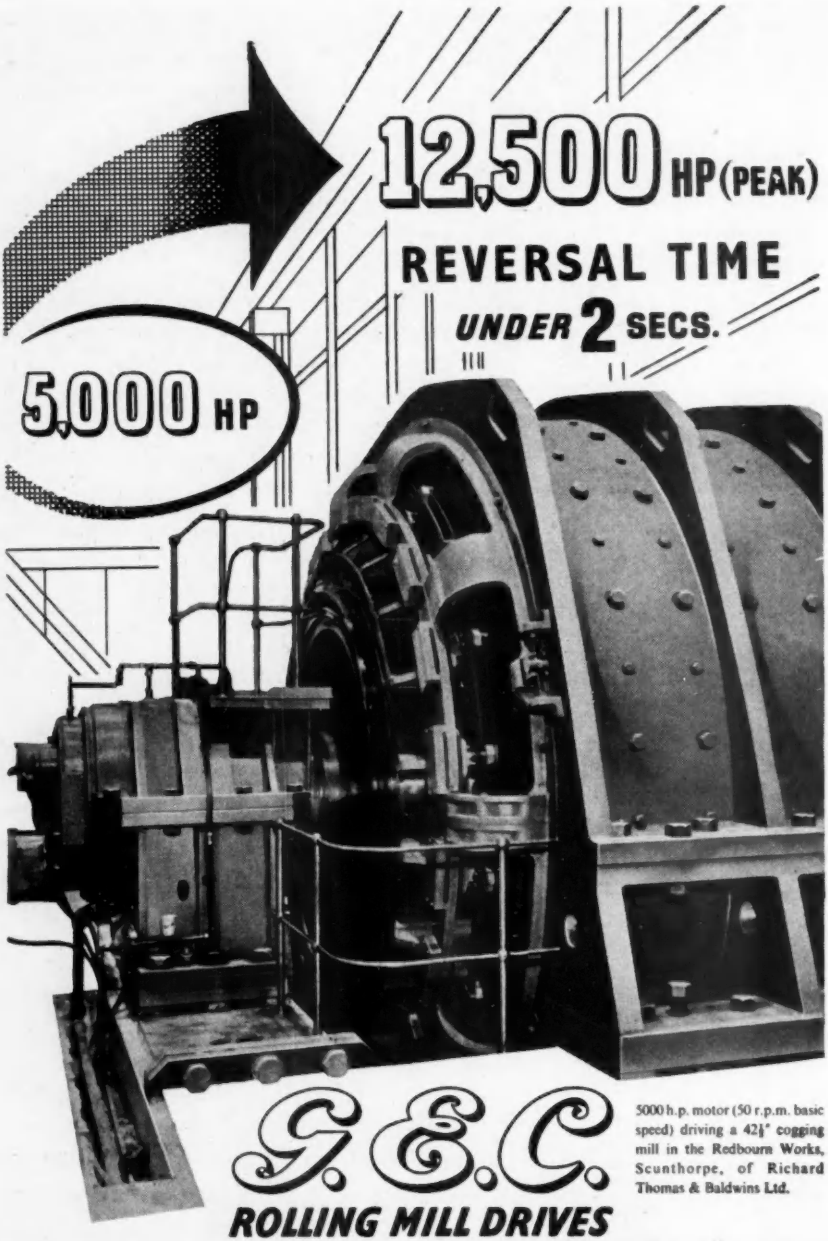

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Editorial

CONVENTION SUCCESS

LAST week's B.E.P. Convention notably fulfilled the promise of success which its programme held out. Papers prepared for this fifth annual meeting had revealed a clearness of purpose that augured well for the business sessions. In the event, delegates took the opportunity the papers offered in a manner that showed how far the Convention has travelled from the doldrums of Brighton two years ago. With a common theme running through all the papers, this great gathering of the electrical industry was aware that it had a job to do—to clarify the need for more electricity in the cause of greater production, and to consider ways and means of obtaining and applying it. Good weather and an excellent exhibition provided a pleasant background to this work, and only one major shadow marred the proceedings: lack of time. Once again, discussions had to be cut short, not occasionally, but at every session, although authors restricted themselves to an admirably brief summary of their papers. This is a problem to which the Convention Council should devote serious thought in planning next year's Eastbourne Conference. There can be no substantial reduction in the number of papers presented at a national conference of this status, and so the solution must be more time for discussion. Many possibilities of obtaining this suggest themselves from the practices of other large technical conferences, and there is one at least special to the B.E.P.C. This is to cut down the time set aside for the private meeting of B.E.A. delegates, which seems out of proportion to their numbers.

COUNTRY COSTS

THURSDAY afternoon's convention session on Electricity and Food Production qualified easily as the most lively since the war, for Mr. Steward's provocative paper on the financing and planning of rural schemes provided the occasion for a rare battle. The issue centred on the thorny question of what the countryman can afford to pay for the electrification of farm and homestead: is there a limit beyond which a subsidy of one kind or another becomes necessary? There was some doubt whether direct Government help would be welcome: that the Central Authority should effectively mulct the more industrialised area boards to help those with proportionately greater rural problems met with the strongest opposition. It was doubly unfortunate that this discussion was of necessity even more severely curtailed than the others, so that many who would have expressed their views had to remain silent, and a balance of opinion could not be obtained. From the few speakers who had their say, however, there was no mistaking how vehemently many in the industry are opposed to the South-Western Board's reiterated claim for subvention, nor how fundamental is the disagreement which exists concerning the extent to which rural areas are already helped, and on how far they can be self-supporting. The issue now moves effectively to the House of Commons, where a debate will be held tomorrow on a private member's motion on supplies for rural areas. It may be that Mr. Geoffrey Lloyd will make this the occasion for restating the Government's position on this difficult question.

GRUMBLES FROM GAS

THE essential need for electricity in the home is causing concern to the gas industry, which at the most supplies only an optional service. The latest complaint on this score comes from *Focus*, a house journal of the North-Western Gas Board. In an issue dealing with fuel in the home it is stated that the use of radios and electric gadgets

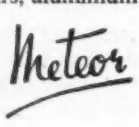
has become so widespread that the installation of power plugs has become almost obligatory. Perhaps the real sting is given in the phrase "Even the portable gas heater, which requires only a gas point, cannot easily compete against an appliance which has no installation cost." What the author has failed to appreciate is the multitude of demands that are made on the electrical installation and the general tendency on the part of architects and builders to skimp the electrical installation in order to save a few pounds on capital cost. In consequence, the consumer may have to provide additional socket-outlets or resort to the dubious practice of taking several supplies from a single outlet. Whether the gas industry likes it or not, the right time to wire a house is during erection and it is our duty to press that such installations be adequate for reasonable consumer requirements, a theme that will not be new to readers. The simple answer is that a gas service is a duplication of fuel supply and must be treated as such. To avoid any redundancy, the ideal is to have only one source of energy to a house, and it is electricity that can provide the consumer with all his requirements.

NIGERIAN POWER

WHEN the Electricity Corporation of Nigeria was formed in 1950, it was known that the existing electrical industry was in a bad way. Exactly how bad the situation was, in fact, has just been disclosed in the first Annual Report. It appears that most of the undertakings were established as amenities rather than as self-supporting concerns. In these circumstances, with all the consequences that flow from such an attitude, the deficit of £84,000, which is less than half that estimated, is a not unsatisfactory result of the first year's trading. The cost of electricity in Nigeria is high, even considering the higher standard of living, and the obvious long-term solution lies in the development of hydro power. Energetic steps to this end are being taken, but serious handicaps lie in the absence of adequate maps and hydrological data. Even more vital is the absence of present financial resources for such developments. It is clear that any large-scale exploitation of hydro power must be paralleled with an opening up of the industrial resources of the country, which raises fundamental political issues. Whatever the decision, however, it is clear that the Corporation will have a most testing time in the next few years.

METAL OF THE FUTURE

TITANIUM, although far from a rare metal, ranking as it does seventh in order of availability, has, until recent years, been confined to the laboratory. Yet this element in its pure form, or alloyed with other metals, possesses properties which make it most attractive both to the aircraft industry and to the gas-turbine manufacturer, due to its light weight, great strength and high corrosion resistance. It is nevertheless only in the past decade that commercial production has been possible, and even then on a limited scale. The reason is that the Kroll process, which enables the metal to be extracted with the essential high degree of purity, is extremely complex and inherently expensive. In Great Britain, production using this process is to be stepped up to some 100 tons/annum. While this is a great advance on the previous output which amounted only to one lb/week, it is still small in comparison with American plans, also based on the Kroll process, which envisage a possible rate of 10,000 tons annually. A recent announcement, however, states that laboratory work in this country has shown that an alternative refining method which holds great promise can be developed. Although no other details are yet available, should it lend itself to large-scale exploitation, with consequent price reduction and increased availability, the engineer will be possessed of a most important range of materials. In the past 70 years, aluminium has developed from a scientific curiosity into a commonplace. Will the next 20 years see titanium take a similar path?



THERMO-ACTION SWITCHES

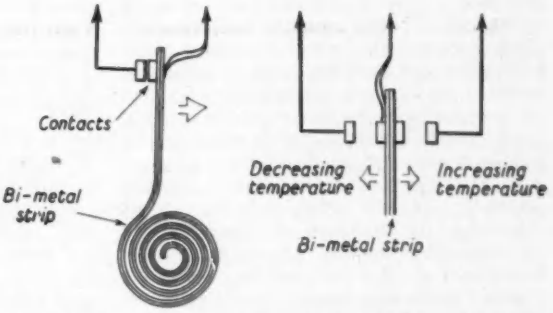
Expanding Sleeve Type Thermo-Switches Described in this Review of Thermostats

By R. H. WARRING

HEAT-SENSITIVE control units, or thermostats, as they are generally called, may use a variety of different principles of operation. The most common types are, undoubtedly, those utilising the physical movement of an element undergoing thermal expansion or contraction which, by suitable linkage, is made to do mechanical work in opening or closing a pair of contacts in the control circuit. There are, in general terms, three different sub-types of "expansion" thermostats in which the element is, respectively, a bi-metal strip, a metal sleeve, and a bulb containing a fluid. These cover the majority of applications in which thermostats are involved.

At the same time there are a number of other types of thermostat where the change in the heat-sensitive element is an electrical rather than a mechanical one. The simple thermocouple is a case in point. The e.m.f. generated at the hot junction of two dissimilar metals in contact in an electrical circuit is dependent on the temperature difference between the two junctions. However, the value of the e.m.f. produced is too small for most practical applications as a thermostat control unit. With one of the most "responsive" thermocouples, for example (iron and eureka), the e.m.f. generated is, roughly, 5 mV/100° C temperature difference. To be sensitive to a 10° C change in temperature, therefore, the associated control circuit would have to be sensitive enough to utilise an e.m.f. of 0·5 mV to close or open the control circuit.

Notwithstanding such limitations, the thermocouple thermostat does have numerous industrial applications, particularly for high temperature work, roughly between 700 and 2,000° C, which is beyond the scope of the previous types mentioned. However, for high temperature work the resistance thermometer is possibly somewhat superior, operating on the principle that the resistance of a conductor increases with increasing temperature, and vice versa. The change in resistance can be used to unbalance a suitable control circuit and produce the required automatic response.



Figs. 1 (left) and 2. Two forms of the well-known bi-metallic strip type of thermostat. On the left is seen the straightforward on-off type whilst the other can give control centrally disposed over a temperature range

A more detailed description of thermo-electric thermostats is, however, beyond the scope of this present article, but before returning to the "mechanical element" types there is the thermo-magnetic control device which is worthy of mention. This is, essentially, just an

TABLE I.—COMPARISON OF EXPANSION THERMOSTATS

PROPERTY	BI-METAL	SLEEVE TYPE	BULB TYPE
Temperature Differential (°F)	2·5 to 3·0	0·1 to 0·2	5·0 to 6·0
Reaction Time (10°F rise)	35 seconds	5 seconds	16 seconds
Reaction Time (10°F rise) (*Radiant Heat*)	27 seconds	7 seconds	10 seconds
Contact Movement	+0·001 in./100°F rise	Constant	+0·001 in./100°F rise
Heat-sensitive Area	1 sq. in.	6 sq. in.	2 sq. in.
Operating Principle	Metal Flexure	Metal Expansion	Fluid Expansion
Comparative Cost	Low	Moderate	High

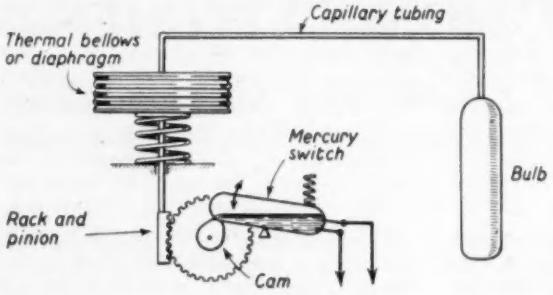


Fig. 3. Bulb type thermostat. Expansion of fluid in the bulb operates the bellows to control the switch position

ordinary permanent magnet which is used to keep a control circuit closed (or open) by magnetic attraction of a spring-loaded arm on which one of the contacts is mounted.

It is a property of all magnetic materials that, if heated to a certain temperature, they lose their magnetism and regain it again on cooling. The critical temperature (called the Curie point) at which loss of magnetism occurs with alloys and magnetic steels, is within the useful range of control temperatures so that, for example, using the device as a fire warning, local increase in heat would de-magnetise the hold-in magnet and trip the alarm.

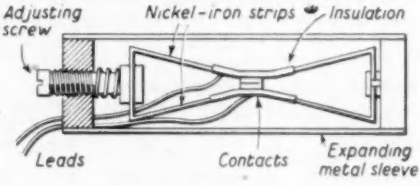
In the bi-metal thermostat, the bi-metal element is generally coiled, as in Fig. 1, with one end of the strip fixed and the other free. The free end of the strip is linked to a contact mechanism so that the contacts "make" or "break" as the strip uncurls or coils up tighter under temperature variation. The type of contact system used depends on the type of control required. In the simple system sketched, an increase in temperature causes a deformation of the bi-metal strip breaking the circuit. When the temperature decreases the coils of the element tighten up again, making contact. The reverse operation could have been used, incorporated as in Fig. 2.

Centrally Disposed Control

Here, within the range of temperature acceptable, the contact controlled by the bi-metal strip remains centrally disposed. If the temperature rises above the desired maximum, the strip curls one way and makes contact in that direction, closing a control circuit to correct the temperature rise. Conversely, if the temperature drops below the desired minimum, the strip curls the other way and completes the other control circuit to bring compensating mechanism into operation. Other variations can be introduced on this simple theme to meet specific requirements.

In practice, the usual range of bi-metal thermostats are generally designed to operate at between about 30 to 90° F (0 to 30° C) with an average operating range of about 40° F (when the temperature differential or difference between opening and closing temperatures is of the order of 2 to 4° F). Improved action may be given by using snap-action permanent magnets on either side of the moving contact arm. These magnets simply hold the moving contact arm in one position or another until the mechanical force generated by the bi-metal strip builds up sufficiently to overcome the magnetic attraction. The contact arm then parts company smartly with the magnet, i.e. the switching has a snap action. In such instruments a mercury switch may be used instead of mechanical contacts.

Fig. 4. Here is shown the simple tension type expansion-sleeve thermostat, or "Thermo-switch." Contacts are insulated from the strips



The useful range of the bi-metal thermostat is determined by the physical design of the components and the properties of the bi-metal element employed. Adjustment is relatively simple by exerting mechanical pressure on the coiled element, this being related by means of a simple scale indicating the approximate temperature of operation. Thermostats of this type are, however, essentially limited to response to air temperature changes. For immersion in fluids, etc., the bi-metal element has to be encased in a suitable tube or sealed container.

The bulb type thermostat works on similar expansion principles, only this time the expansion of a fluid in a bulb is translated into mechanical movement by coupling the bulb to a thermal bellows as in Fig. 3. The changes in pressure of the fluid contents of the bulb expand or contract the bellows (or sometimes a diaphragm) and, by suitable linkage, a

reasonable mechanical power can be generated to trip a mercury switch or operate a set of contacts. If necessary the bulb can be separate from the main instrument, coupled to it with a suitable length of tubing, and immersed in liquids, etc., provided the surrounding medium has no corrosive action on the material from which the bulb is made. A typical range covered by such thermostats is 30 to 300° F (10 to 150° C) with a corresponding temperature differential of between 4 and 12° F. Adjustment is by mechanical loading of the switching mechanism.

Expanding Sleeve Thermostat

The third type of thermal-expansion thermostat to be described in which the sensitive element is a metal sleeve surrounding the switching mechanism, is the subject of a patent by Fenwal Incorporated of America. Four types of these "Thermoswitches," as they are called, are in common use in the United States, all working on essentially the same principle, although two are actuated by a compressive force generated by the sensitive sleeve and the other two by a tensional force.

TABLE 2.—CURIE POINT OF TYPICAL MAGNETIC ALLOYS

ALLOY	CURIE TEMP °C	ALLOY	CURIE TEMP °C
†Alni	726	9% Cobalt ...	841
†Alnico ...	800–810	15% Cobalt ...	840
†Alcomax ...	845–870	35% Cobalt ...	890
†Hycomax ...	865	2% Chromium	730
2% Cobalt ...	775	4% Chromium	745
3% Cobalt ...	804	6% Chromium	801
6% Cobalt ...	832	6% Tungsten	759

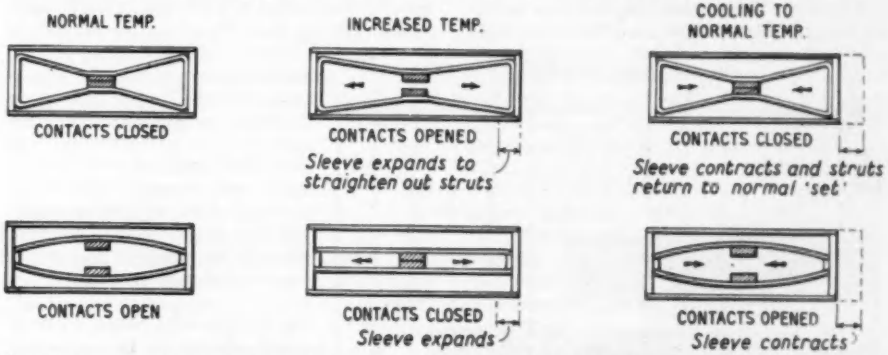
† William Jessop & Sons, Ltd.

The construction of a simple expansion-sleeve thermostat is detailed in Fig. 4. The "Thermoswitch" consists essentially of two silver contacts mounted on, but insulated from, two bowed strut members of nickel iron with a low coefficient of expansion. Surrounding the whole is a close fitting metal sleeve of brass or stainless steel. One end of the strut assembly is brazed to the sleeve and the other end anchored to the sleeve with a screw adjustment to vary the residual tension or compression in the assembly. Changes in temperature cause the sleeve to expand or contract, thus varying the amount of tension or compression imparted to the strut assembly, which in turn controls the position of the contacts.

The operation of a tension type "Thermoswitch" is shown in Fig. 5. The contacts are normally closed. With increasing temperature the sleeve expands (and at a much faster rate than the low-expansion struts which are, to all intents and purposes, virtually non-expanding). This forces the stud anchored to the sleeve to exert tension on the struts until, at a certain point, the struts have been straightened out to the point where the contacts are opened. If the temperature drops again the tension on the struts is decreased as the sleeve contracts and so the contacts close once more.

Starting with the contacts open, in Fig. 6, exactly the same principles are involved, only this time the struts are bowed in the opposite direction. The tension produced by the expanding sleeve closes the contacts as a certain high temperature is reached and allows them to open once more as the temperature decreases again.

In the compression type of "Thermoswitch" the actuating force is a compressive one consequent on a drop in temperature, as shown in Fig. 7, again providing alternative operation depending on the initial set of the struts. Chief advantage offered by compression



Figs. 5 (upper) demonstrates the expansion of the sleeve, and contact opening with increasing temperature for the thermo-switch having in-bowed struts. In Fig. 6 is shown the type having struts bowed outwards and consequently contacts normally open at normal temperatures, closing as the temperature rises

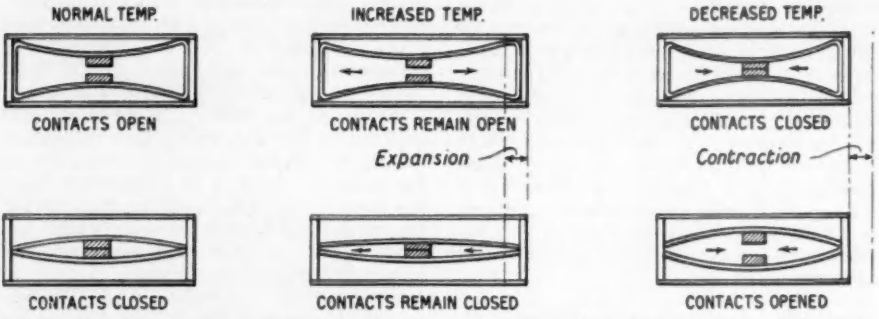


Fig. 7. The action of the compression type Thermo-switch. Upper, the in-bowed strut type in which the contacts are normally open, below its counterpart whose contacts close at normal temperatures

operation is that there is less likelihood of damaging the element assembly due to momentary exposure of extremes of temperature outside the normal range or setting of the instrument. Momentary exposure to temperatures of 100° F or more in excess of the normal set point may well result in the element breaking in the tension type of switch whilst the compression type can take a momentary overload or "overshoot" temperature in excess of 400° F without damage to the element. The nominal working range for compression type "Thermoswitches" is from about —100° F (—50° C) to about 400° F (200° C). They are particularly recommended for temperatures below 0° F. Tension type thermoswitches are generally operated within a range of 0 to 500° F (—20 to 260° C), or a working range of about 500° F, e.g. +100 to +600° F, etc. Others are designed to work up to +1,100° F.

Compared with the other types of "expansion" thermostats discussed, these sleeve type switches show an amazingly low temperature differential. This, on average, is as low as plus and minus 0·1° F, largely as the result of the complete elimination of mechanical linkage in the operation of the contacts. They also have a much faster reaction time than their bulb or bi-metal element counterparts—something like three times as fast as the bulb type and seven times as fast as the bi-metal switch. Some typical comparative data are summarised in the first table for convenience of reference.

Vibration Resistance

One other property of sleeve-type switches is of particular interest for installations where mechanical vibration may be encountered. The element assembly has a non-linear spring gradient and the natural frequency is extremely high—far above anything likely to be encountered in industrial application. To all intents and purposes, therefore, this type of switch is essentially vibration proof and thus can be used under conditions which might materially affect the accuracy of other types of thermostats employing mechanical linkage. Fig. 8 is illustrative of some test data produced by Fenwal Inc. showing the actual motion or vibratory displacement of the switch element in typical thermostats of three different types when subjected to an oscillatory loading of 2,000 cycles/minute and 0·001 in. amplitude. Both the bulb and bi-metal thermostat elements show marked susceptibility to this oscillating loading, whereas the sleeve type switch remains virtually unaffected.

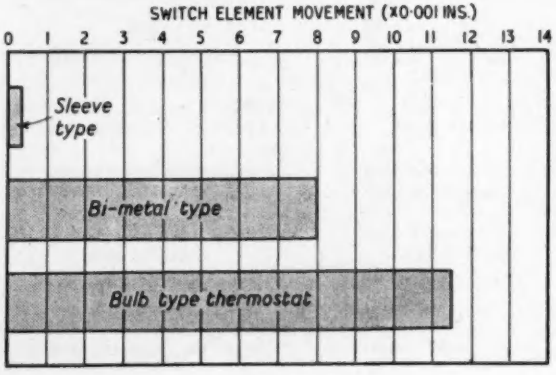


Fig. 8. Vibratory displacement of switch element in thermostats of the three different types for an oscillatory loading of 0.001 in. at a frequency of 2 kc/s

CORROSION IN WATER-TUBE BOILERS

Prevention of Fireside Wasting is Discussed in this Article

By SYDNEY D. SCORER, A.M.I.Mech.E., M.I.Mar.E.

IT is now nearly quarter of a century since the last serious water-tube boiler explosion attributable to external corrosion. As a result of the formal investigation of that explosion, the regulations concerning the removal of brickwork from shell and drum seams were modified. Boilers situated in the open must have brickwork removed at least once in every six years, and those protected from the weather at least once in every ten years. Nevertheless, corrosion is a continuous process not amenable to statutory orders, and it is the responsibility of the operating engineer to see that his plant does not become unsafe during the intervals between drum exposure.

This can easily happen even in the most carefully operated boiler. The process of combustion itself results in the freeing of potentially corrosive compounds which are then distributed through the gas passages of the boiler. There are always certain amounts of carbon dioxide, sulphur oxides, metallic sulphates, etc., mixed with the flue dust and they deposit out in every stagnant pocket in the boiler structure. Any water present combines with the sulphur dioxide to form sulphurous acid, which, in turn, combines with more water to form sulphuric acid. If sulphur trioxide is a constituent of the flue dust, it also will unite with water to produce more sulphuric acid. This acid reacts with the boiler metal and rapidly corrodes the wetted surface. Certain metallic sulphates also take part in the corrosive attack when the boiler has cooled down and they have had an opportunity of absorbing water.

The Role of Moisture

Without water many of these corrosive reactions would be unable to develop. However, short of an impracticable solution such as keeping a small fire burning continuously in the furnace, it is difficult to see how moisture can be eliminated from the fireside of a standing boiler. A change in atmospheric temperature often results in the deposition of "dew" on the cooler boiler surface, and the film is rapidly absorbed by the soot adhering to the metal. When the boiler foundations are damp, moisture may seep upwards through the brickwork to places where soot collects. Leaks from mountings, seams and tube expansions also tend to spread over the adjacent boiler metal. Roof leaks and condensation add their quota to the total moisture available, and when a boiler is out of service a damp atmosphere can soon be created.

In a multi-drum boiler most of the danger areas are in the lower part of the structure. Soot tends to collect between the tubes at the upper surfaces of the mud drums, and is in an advantageous position for absorbing any moisture which runs down the tubes. Both the tubes and the drum are likely to be severely corroded if the boiler is left standing for any length of time, but the accumulation can be readily cleared with a compressed-air jet when the boiler is first shut down.

Compressed air is also useful in certain designs of boiler where the brickwork below the mud drums forms a ledge or an annular space between the drum and setting. Soot may bridge the space, absorb moisture, and cause serious wasting of areas normally inaccessible for inspection. A few minutes with an air jet at each shut-down eliminates the risk.

Danger Areas

The most serious explosions due to damp soot, however, have usually originated in the mud-drum ends. The side walls of the boiler casing are often built close to the ends, and, at best, only a portion of the manhole endplate can be seen. At the blind end there is often no provision for inspection without knocking in a portion of the wall.

In either type of end the fine dust becomes closely packed between the metal and the near-by brickwork. Moisture from minor door leakages or from any of the sources already mentioned may keep the soot damp, and corrosion proceeds actively, especially during standing periods.

In dished endplates the radius to the flanged portion (i.e., the knuckle) is always the most highly stressed and, probably because of the anodic conditions thus induced, the lower part

of the endplate in way of the knuckle may be smooth wasted to nearly the full thickness of the plate. The attached portions of the shell may be similarly affected, and in the last serious explosion of the sort the endplate ruptured at the knuckle and was forced completely out of its shell.

In certain parts of the U.S.A. where the regulations concerning brickwork removal are not so stringent as here, this sort of explosion still occurs every now and then. In the British Isles, fortunately, the Factories Act recommendations ensure that these danger spots will be inspected at least once every ten years, and more often if the inspecting authority considers it to be necessary. These recommendations must have been responsible for the prevention of many explosions during the past twenty years.

The drums of the sectional-header type of boiler are largely immune from dangerous soot accumulations, but these boilers still have a few places which should be regularly inspected for fireside wasting. The lower parts of the front headers, for example, are often protected by brickwork, and corrosive dust may accumulate behind it. The front caps or the tube expansions occasionally leak and the water gravitates to the bottoms of the headers. Consequently, the metal wall is attacked and thinned by the freed acid and in time may perforate or fracture under pressure.

A similar effect obtains at the back-header mud-drum, and corrosion may also affect the mud-drum nipples if the soot builds up. Probing, if not complete exposure of these parts is advisable every few years, together with the removal of as much dust as possible at each shut-down.

Tube Corrosion

Incidentally, in connection with the sectional-header boiler provided with a "hairpin" superheater one would mention the pipes which lead steam to and from the superheater headers. The pipes are often almost completely hidden by brickwork and have been known, on occasion, to corrode externally to the point of perforation.

Any water or superheater tube at only a slight inclination to the horizontal is likely to have its upper surface corroded if even a thin film of soot is allowed to remain on it under standing conditions. In a number of industrial boilers shut down during the war because of concentration schemes, many had to have the top two or three rows of tubes renewed before they could be used again, on account of the external corrosion that had been proceeding during the period of hostilities. In some of them the spaces between the tube ends had not been properly cleaned out and the tubes were found to be badly wasted below the soot.

From the above remarks it will be realised that much of the fireside wasting to which water-tube boilers are liable develops under standing conditions. Remove the soot or keep it quite dry and little damage will be done. As that, however, is a counsel of perfection, soot accumulations must be regarded as analagous to potential acid accumulations and be treated accordingly.

Nevertheless, although flue dust deposits are the major source of fireside wasting, there are others which result in minor defects. For example, drum seam leakages may cause local trouble, and if they are not attended to, may necessitate an expensive repair. Leakages from seams below the water level are the most serious as the water often entrains particles of grit which exercise a sand-blast action on the adjacent plate. A tube expansion leakage may also cause severe cutting of the tube surface near the expansion, and, if undetected for some time, nearby tubes may be affected.

Soot Blowing

Within comparatively recent years failures of water tubes due to erosion have increased somewhat, probably due to the more widespread use of soot blowers. When first installed, these appliances are carefully aligned to prevent a concentrated jet from playing on any individual tube. In course of time, however, the soot blower nozzles may become slightly displaced or get out of order, with the result that a jet of steam and fine flue dust is projected on to one or more tubes. No metal can withstand this action for long and the tube wall is soon eroded to rupturing point.

In a recent explosion attributable to soot blower erosion, the soot blower had originally consisted of a steel pipe with small blower nozzles welded along its length at suitable intervals. Two of the nozzles became detached at some time, leaving relatively large holes for the escape of steam when the blower was in action. The enlarged jets eroded the underside of the water tube in way of them and a split over 12 in. long ensued.

Precautions to be taken against accidents of this sort are that the alignment and condition of the blowers should be checked at each shut-down. In addition, the water tubes in line with the jets should be carefully callipered. When erosion occurs there are rarely any well-

defined limits to it, and, at a casual glance, the tube surface appears to be normal. It is only by callipering above and below the potential danger area that the smooth wasting can be discovered, and when measurement proves the tube to be 2 W.G. below the design figure, the tube should be removed immediately and a new one fitted. It is also sound practice to remove at five to ten-yearly intervals one or two sample tubes from the inaccessible rows just beyond the direct range of the blowers. The removed tubes can be sectioned longitudinally and transversely and by this means their exact condition determined.

Our readers' views . . .

Registration

TO ignore Megohm's page in your issue of May 28 might be regarded as accepting his criticisms in full; actually the reverse is the case because it is a recognised journalistic trick that a few spicy extracts, torn from their context, can give an entirely different impression to that intended by the original article.

Megohm's quotations are from four separate articles and to make an effective reply would occupy almost the same space as the original articles. As this would be too big a strain on your limited pages I can only say that if any of your readers regard Megohm's criticisms as really serious, I suggest they obtain from our office a copy of the issue containing the articles in question and judge for themselves the true intent and meaning of such articles, viz:—safety of the public in the use of electricity.

F. W. Purse

HON. DIRECTOR,
NATIONAL REGISTER OF ELECTRICAL
INSTALLATION CONTRACTORS.

◆ ◆ ◆

More Socket-Outlets

WITH reference to Megohm's article entitled "More Socket-Outlets" in your issue dated May 14, I would like to suggest that his correspondent would have had his problem very readily solved by using one of the admirable fittings manufactured by New Day Electrical Accessories, Ltd., namely the triple fireside outlet together with additional twin socket taken from the fused spur on the triple outlet. He would then have alongside his bed four 2 amp, 3-pin outlets with a connection for a clock covered by a 5 amp fuse in the appliance, together with a 13 amp fused-plug, giving him ample facilities at very small cost and making for perfect safety.

H. J. Wilson

STONELEIGH, SURREY

Small Portable Tools

REPLYING to "Handyman," I do not want restrictive legislation, in fact I am as good an anarchist as most, *but* with some sense of responsibility I point out that the insulation security of these small tools appears to be inadequate and action is desirable. As an individual user of such an appliance I am not in a position to take any effective action. The makers disclaimed responsibility for the second armature fault stating that the machine was in a bad condition—so that was that.

As an engineer who came up 'the hard way' and with forty years' experience, I state that the machine was in good condition, in fact far better than one would expect and that three breakdowns in quick succession following a change to a.c. and a mischance in rewiring the plug is more than coincidence. The garage where it is kept and used is a substantial brick building and is on the central heating system.

It would be interesting to have some independent authority set up several such machines, acquired unbeknown to the makers, alive but not running, to see just how long their insulation would 'stay put' at 240 V a.c. I feel certain that such a test would justify my contention that restrictive legislation either in regard to operating voltage or insulation security is necessary. Contact with them in use is so very intimate. Incidentally I noticed the machine in question advertised in the *Radio Times* recently for use in the home.

A domestic supply voltage of 110 as suggested by A.M.I.E.E., however desirable, would seem beyond the region of practical politics at this late stage and even then the mid point should be earthed before any easement in insulation security could be tolerated.

D. Kingsbury

SUTTON COLDFIELD

From AN ENGINEER'S NOTEBOOK

GERMANIUM continues to be something of a wonder child for scientists, and we are still a long way from fully understanding its behaviour. One of the latest of its properties to be discovered is its ability to transmit infra-red light to a degree which can be varied by the passage of an electric current through the germanium at right angles to the path of the light. What is more, the sensitivity is remarkable and this was demonstrated most excellently, I thought, at the Royal Society's Conversazione. Here a small block of germanium about 1 in. long was transmitting light from a tungsten lamp. Across the block was applied the amplified electrical output of a gramophone pick-up. This current was sufficient so to modulate the beam of light, that by the use of a lead sulphide cell and a loudspeaker, the original music could be reproduced from the light at approximately broadcast quality. I am not sure whether such a phenomenon will find a commercial application, but already germanium crystal triodes are coming into use and of course the diodes are in no way new. Further, germanium exhibits photo-conductive properties that have by no means been fully explored. No wonder that concern is being expressed at the availability of supplies of germanium. There has been much discussion of its possible commercial extraction from flue dust, and more recently I see that work is being carried out in search for a suitable substitute for germanium. The first success is reported of the discovering of an aluminium-antimony alloy that has many properties of germanium and is suitable for operation at higher temperatures.

* * *

THERE can be few callings, I feel, so democratic in spirit as that of the engineer. Within this broad classification there are many specialised branches, yet all serve that common goal of getting an engineering job done in the best possible way, without thought to sectarian interest. An electrical engineer suffers no sense of disloyalty to his profession in using a mechanical device if it fulfils the desired function better, and the same outlook is true of every sectionalised group of engineers. (Would that the same spirit permeated politics.) This broad-minded attitude is taken for granted, whatever individual viewpoints exist. There may be exceptions and perhaps in this category there falls a purely electrical method of accelerating the cooling of transformers that has recently been drawn to my notice: but let me confess at the outset that I have insufficient details on which to express a proper judgment. Briefly, the system makes use of rectified a.c. to apply a potential between metal screening on the transformer coils and the outer tank. This d.c. potential sets up a flow of electrostatically charged oil between the two parts and thus accelerates the transfer of heat from the coils to the tank. Obviously, more rapid cooling will be obtained by such means, and certain claims are made for the method which at present I hesitate to repeat in print, and how it will stand up to the rough and tumble of surge stresses and the like, I leave to those who are better informed.

* * *

WITH the American eye for a good turn of phrase, a new computing machine has been aptly termed a robot psychologist, yet such a conglomeration of valves and circuitry must surely be the very antithesis of anything psychological. It is in fact a computor specially designed to deal with statistical data from some fifty intelligence tests and to analyse them under twelve different abilities. The design has been prepared according to the requirements of the U.S. Army personnel research branch and is intended for mass psychology tests. An unusual feature of this computor is the presentation of results in the form of a scatter diagram on a cathode ray oscilloscope, from which I suppose the psychologists can neatly ticket the individual under test. But of psychology there is not a jot. Indeed, from the very fact that the results of such tests can be handled by a "robot," suggests a measure of over-enthusiasm. I have no quarrel with the tests themselves, they can be an unquestionable asset to a quick approximation to the main qualities of an individual, but it is just the factors that are more easy to measure that are subordinate to the less tangible qualities of an individual. The time of test also creates a variable, and if ever I have to submit myself to the robot psychologist I shall make sure it is not early on a Monday morning. *E.R.G.*

CONVENTION RECORD

GOOD weather combined with interesting papers and provocative discussions to make last week's Convention at Torquay by general consent equal to the best that have been held since the war. Indeed, from the very first day, when the evening opening of the Convention Exhibition proved a popular introduction, there was an air of success about the whole crowded programme of activities.

E.A.W. Luncheon

Our account last week took the story of the Convention up to Thursday, but some important functions were inevitably dismissed with a brief mention. Amongst them was the E.A.W. luncheon. This annual event was again presided over by Lady Swaythling, who was warmly received on this first appearance since she was honoured by Her Majesty. Lady Swaythling proposed the toast of "the Borough of Torquay" in her usual inimitable style, remarking in the course of her speech that the 1954 E.A.W. conference was to be held in the town. After the Mayor had replied with a tribute to Lady Swaythling and to the activities of the Torquay branch of the E.A.W., the toast of "the Electrical Industry" was proposed by Miss Margaret Hyndman, Q.C., an eminent Canadian barrister and woman's representative.

The New Presidential Badge of the Convention

The quarters of the Presidential Badge show a power station, an electric lamp, an electric fire and a motor. Above the shield is a globe surmounted by a Grid tower

Miss Hyndman referred to the advance being made with electrification in Canada. In three provinces alone, she said, 182,310 farms were electrified last year. The result, she estimated, was the saving of some 47½ million woman hours per year. In Canada only 22% of the known water power resources were yet developed, and the discovery of oil in the western provinces had made steam plant attractive. In the result, there were very great opportunities for the electrical engineer.

Sir John Hacking responded to this toast, emphasising how much the electrical industry had done to help social progress. It had, indeed, effected a peaceful revolution. This was particularly so because electricity, being a high-grade source of energy, could be used readily in small quantities.

Annual Dinner

On Thursday was held the official Convention Dinner. Sir Archibald Forbes, Immediate Past President of the F.B.I., was the evening's principal guest, and it fell to him to propose the toast "the Electrical Industry." He emphasised that a supply of electricity at a reasonable cost was vital to this country's industry, and he congratulated the supply industry on the way some of its difficulties had been overcome. The manufacturing side of the

industry also deserved praise for its outstanding work in the export field.

Sir John Hacking responded, and in the course of his speech said that it was still necessary to sound a warning note about the plant position. If really extreme cold weather was encountered, there would still be difficulty in meeting the sudden heating demand. It was vital to continue to expand until any possible load could be met. Moreover, the replacement of old plant offered a chance of saving fuel.

The industry was well aware of the importance of export markets, and sales there could only be obtained by manufacturers undertaking the difficult task of going out into the field. Some competitors in other countries were offering long-term credit to prospective customers, and the British Government could do more to promote exports by giving such export credit help than by stopping manufacturers from producing for the home market. Representations had been made to the Government on this point. Any overall priority for exports was not practical politics, was not engineering and was not sensible so far as electrical generating equipment was concerned.

In his closing remarks, Sir John Hacking said that because of difficulties about steel, plant commissioned in 1953 would be little more than that in 1952.

At Friday's morning session the Electrical Forum, which preceded the annual meeting, again attracted a large audience, and it is reported on a later page. At the A.G.M. itself, Mr. J. R. Beard, C.B.E., duly succeeded Sir John Hacking as President of the B.E.P.C. Sir Harry Railing was elected the new vice-president.

The venue of next year's Convention, Eastbourne, was agreed to, the opening date being Monday, June 14. It was further agreed that the papers by Col. Leeson and Mr. E. R. Wilkinson should be sent to all M.P.s.

Heading this group of photographs is (1.) the Convention Council. (2.) Mr. and Mrs. W. J. Gilscott and Mr. and Mrs. H. D. Wood, of the S. Western E.B., at a L.D.C. party. (3.) Mr. D. Maxwell Buist, Mrs. Leeson, Mr. and Mrs. Parrott, and Mrs. Buist at the same function. (4.) Mr. J. Peattie and Mr. P. V. Hunter with their ladies before the E.A.W. luncheon and (5) Dr. J. L. Miller and Mr. E. R. Wilkinson

1953

Mr. S. F. Steward

presented the main paper

of an important series concerning

ELECTRICITY— AND FOOD PRODUCTION

AN agricultural revolution is in progress on the land, and the agricultural industry must be modernised from cowhouse to cottage kitchen to give the background conditions required for the desperately required 60% increase on pre-war food production. In this work, electricity has a key part to play.

Since Nationalisation

Before nationalisation, almost 75% of the rural areas of the country were separated from the large centres of population for the provision of electricity supplies. Some valuable pioneer work was carried out, but in general after 1948 there was a steep increase in the number of farms provided with electricity supplies. The 1947 Act provided a much broader and more balanced association of urban and rural areas than had existed before, and also introduced a wider measure of public responsibility. Another change in farm supplies since nationalisation is that better use is being made of them: the increase in units sold to farm consumers is proportionately higher than that for all classes of consumer taken together.

The S.W.E.B. area provides a specially difficult case for rural electrification, having a lower population density than any other board. Like all other boards, it suffers from the sharp increase in capital costs, an increase which has not been fully reflected in tariffs.

A comprehensive survey has been carried out by the S.W.E.B. to discover the electrical needs of the rural community, the cost of complete electrification, the extent to which it would be self-supporting, and the engineering resources required. At the time the survey was taken, 55% of the territory of the board was "undeveloped"—more than half a mile from an 11 kV line. At present-day costs, to develop this area would entail an expenditure of about £17 million.

Various systems of financing such rural work are available, such as a capital contribution and an annual minimum guarantee. The S.W.E.B. has decided on another method, that of the line rental, calculated on estimated consumption so that an initial return of at least 20% of the capital expenditure is obtained on all new rural development. This 20% is often calculated for a group of consumers rather than for one individual, and it is subject to a rebate for higher consumption and to a three-yearly revision. During the first year of negotiations under the scheme area averages were 7s. 6d./week for farms, 1s. 9d. for other rural premises, and under 1s./week for cottages.

Economic Problems

Helpful as such schemes are, however, as rural development goes deeper into thinner territory, economic problems are becoming more difficult of solution. A rural scheme, to be self-supporting in isolation, probably requires a return of 30% on the capital expenditure incurred in its development. Since the supply industry lives by diversity, however, a scheme having an initial return of 20% is a fair commercial risk. Yet such a scheme is only really suitable for groups of consumers who show a fair chance of becoming self-supporting eventually. The charge for rural

1. Messrs. J. F. Prickett, W. Simpson, J. A. Aked, and A. McLellan. 2. Messrs. D. Bagley, E. Wrigley, D. C. Whyte and W. H. Dugmore. 3. At Tuesday's reception—Messrs. J. R. Rankin, D. Moffat and S. M. Rix with their ladies. 4. Mr. H. C. Lamb, Past President, I.M.E.A., Mr. H. C. Ogden and ladies

development beyond this becomes prohibitive for the prospective consumers, and some special steps will have to be taken. This position is being reached in the south-west, and will develop in the areas of other boards having large rural obligations.

Challenge for All

For the farmer this situation is a challenge to step up his consumption. Unless rural electrification is to be subsidised by other classes of consumer, a greater average revenue per consumer must be secured. For the area boards the situation means close attention to engineering techniques to keep costs at a minimum, perhaps by some sacrifice of standards of continuity and also by salesmanship to increase units sold and extend diversity. Finally may be considered what this challenge means for the industry as a whole and for the Government. On the Central Authority falls responsibility for ensuring that the overall financial arrangements of the industry do not penalise boards with large rural responsibilities. Such action can ensure that the capital resources devoted to electricity are employed to the best advantage.

Yet such methods cannot go all the way, and for the outer fringe of electrification. If for reasons of food supplies it is imperative that a public supply of electricity be made available to remote areas, then the State must take a hand with some form of subsidy to make the provision of that supply practicable.

. . . for Agriculture

IN agriculture, as distinct from horticulture, "high farming" is the answer to food shortages. Put simply, this is the stepping-up of productivity so that the farm yields the maximum output of food irrespective of relative profit. This is in contrast to "low farming," which operates to produce a reasonable profit with minimum investment. Obstacles to high farming are two-fold: the considerably greater capital required and the greater degree of technical skill and management needed.

The first of these problems is widespread; the second demands a rise in the standard of farm working and living. Such thoughts lead to the conclusion that high farming is impossible without high electrification. Yet in any international ranking of rural electrification achievement, Great Britain takes a humble place with 36% of the total farms listed still unconnected.

In technical details Britain is ahead in many respects, notably as far as milk production and crop drying applications are concerned, and in education and publicity. High-voltage distribution is practiced, rather than the use of heavy medium-voltage lines as elsewhere. Yet it is possible that the distribution engineers have not exhausted all their ways of reducing supply costs. The commercial engineer has done much to develop attractive loads, but he, too, may still make progress.

On the farm electrification means labour

saving, output increasing, and retention of position. On a farm of some 75 acres, the *minimum* saving from using electrical methods is perhaps 22 man-hours per week—perhaps an effective 20 weeks work a year. Mainly this will mean freeing labour for other work on the farm, and on the national average this could mean increased production of some £300/year.

During 1951-52, however, farms in the B.E.A. areas had an average consumption of only 4,700 kWh. For a mixed farm based on a 20-cow herd, the consumption might easily be 17,000 kWh, including off-peak grain and crop drying. The cost of electricity cannot be the stumbling block, for it would only be about £100 in a turnover of several thousands of pounds. Capital cost of equipment is a more probable difficulty, and this may be met by lower-priced equipment, hire purchase, or even hire. An even more important factor, however, is probably the absence of any outside drive: the all-electric idea must be sold to the farmer.

Selling followed by installation is the only way of obtaining high electrification. An advisory service alone is not good enough. In many cases, the district man is the key to the situation, but he must be provided with, and must rely on, specialist advice at a higher level. Red tape should be cut, so that in appropriate cases the specialist can go directly to the consumer, so as to save him repeated calls from a succession of officers.

. . . for Horticulture

HORTICULTURE is too often neglected by the supply engineer, and yet it is a major rural industry which can vitally affect the economics of the country generally and of rural electrical development in particular. Imports of total horticultural requirements cost £100 million every year, and the home industry is providing only about 53% of total requirements. Moreover, this proportion is growing less. This decline cannot be halted by higher prices: the answer lies in increasing the overall efficiency of the industry generally, and so cutting production costs to a point where it is economic for the grower to produce to the maximum of his holding and to gain and invest capital in the expansion of his business.

Electricity can help in many ways, notably, for a start, by providing good lighting, which can usefully extend working hours. Pumping is frequently a useful way of avoiding quite high charges for water from a public supply, and it has the advantage of imposing the highest electrical load in spring and summer.

Space-heating of greenhouses by electricity is unfortunately uneconomic in general, though this method is suitable in other types of shed, etc. Even more useful can be electrical control of space-heating where automatic stokers are used for boilers supplying hot water, and the circulating pumps, stoker motors and f.d. fans also provide a useful load. Soil-warming is a different matter and here electricity is better than alternative fuels. Moreover, so far as the supply industry is concerned, the load has the advantage that it can be kept right off the peak.

All these uses of electricity add up rapidly, and for a holding having half an acre of heated glasshouses, two propagating houses and a quarter of an acre of dutch light frames, the annual consumption with full electrification might be as high as 254,700 units: 240,000 off-peak. With a total installed load of 167 kW, only 35 kW would be "on-peak," and this would be subject to some diversity.

Looking at the picture on a national level, the load which might feasibly be connected comes out at 699 MW, and the annual consumption 775 m units. The cost to the horticultural industry for equipment and wiring would be about £19 m, but the industry is in any case one of high capital expenditure. The load factor would be low—about 13% calculated on the industry itself—but referred to time of system peak, it might have a value as attractively high as 200%.

Authors of three of Thursday's papers —left to right:— Messrs. A. W. Gray (Horticulture), C. A. Cameron Brown (Agriculture) and F. E. Rowland (Equipment)

. . . the Equipment

FARMS are scattered about the countryside, and the necessity for servicing some of their electrical equipment presents problems which do not exist in urban markets. To give consumers the best advice and service some properly integrated method is required, whereby manufacturers, electricity boards, electrical contractors and agricultural implement dealers can all co-operate. The manufacturer's job is to make his appliance as cheaply as possible, to distribute through trade channels, to publish descriptive literature and to advertise his products. The distributors acting as a link between manufacturers and farmers should give advice prior to sale and service thereafter. Through them, the farmer can receive unbiased advice from local people he knows.

If such tasks are left to the manufacturer, he will have to build up an expensive and elaborate direct sales organisation, and this will act against that reduction in prices which is so generally hoped for. Moreover, the farmer will be worried by several salesmen for each item of equipment he requires.

Discussion

THE discussion on the food-production papers was opened by MR. J. T. BERESFORD, of the S.W. Consultative Council. He suggested that if other boards had made the same progress as the South Western E.B. since vesting day, over 50% of farms would now be electrified, instead of 42%. Section 36 of the 1947 Electricity Act laid it down that the combined revenues of the electricity industry should be sufficient to meet the combined outgoings. He claimed that this meant that it should be the function of the wealthier boards to support their poorer brethren.

Farmers in this country had to endure at present a lower standard of living than their overseas competitors. Farmers as such did not need special consideration, however: the whole rural population should be treated alike. The S.W.E.B. had reached a point where further rural electrification would be uneconomic. Other boards would soon get there also.

MR. TOM JOHNSTON (Chairman, N. of S. Bd.), who followed, emphasised afresh that two out of every five in these islands live on imported food. If the sub-standard farm could be raised to the level of the national average, the problem would disappear. Propaganda by supply authorities among farmers could help. One particular problem in the North of Scotland was that of poor grazing land, which would not support enough cattle in the winter. Electrical hay-drying was proving promising here, giving hay of an excellent quality. Some areas, however, had to be accepted as being beyond any probable chance of economic electrification in the foreseeable future.

An attack on views previously expressed was made by MR. J. S. PICKLES (Chairman, S.W. Scot. E.B.). He claimed that the area boards in a better position had helped the others by agreeing to a national bulk supply tariff varied only according to coal cost. In general, this had helped boards in the south of England. Revenue from rural schemes always seemed to be higher than the original estimates of its magnitude, and this could help. He was an unrepenting opponent of subsidies because subsidy meant strings. He did not really see that two wealthy industries like farming and electrical supply could really be in need of a subsidy. Moreover, he thought that the areas of electricity boards under the 1947 Act had been extremely well chosen.

Another attack, on earlier speakers, came from MR. A. W. FERGUSON, of N. Ireland, who called for costs alone to be covered when electricity was taken into rural areas. Time was needed to make rural electrification pay. MR. J. A. DUNCAN (Member, Merseyside E.B.) called for Government help for farmers to encourage them to invest capital in their industry. Farming today depended on "a sea of imported oil" and the obvious load for electricity supply to aim for was the farm tractor, which might be battery powered. MR. F. W. GODDEN (E.M.E.B.) thought that this might be worth attempting, though it was a somewhat forlorn hope.

The discussion was closed by SIR HENRY SELF (Dep. Chairman, B.E.A.), who said that three years back the Central Authority had declared a policy of providing "backbone and ribs" of a transmission system. It had spread this throughout the country, and it paid for points of supply. The supply industry should work out for itself, without government intervention, whether to tilt tariffs in favour of rural schemes.

1. Lord Citrine presents the first Presidential badge to Sir John Hacking. 2. Sir John passes on the badge to Mr. J. Beard. 3. The platform at the B.E.A. private meeting. 4. The platform during the forum. 5. Mr. J. W. Simpson being received. 6. E. A. W. luncheon top table. 7. Sir John and Lady Hacking and Mr. E. G. Batt at the exhibition. 8. At the Ladies' Tea. 9. All aboard for the sea trip

Forum and Discussions

BEFORE Friday's annual general meeting, the Electrical Forum, which proved so popular last year, was again held. This time the panel, who discussed delegates' questions, comprised Dame Caroline Haslett and Messrs. Eccles, Golding, Leeson, Steward and Wilkinson. Amongst the questions considered was the desirability of a central electrical exhibition at Earls Court or Olympia. Col. Leeson thought that such an exhibition would be too unwieldy if it represented every side of the electricity industry. Dame Caroline called for a sectional exhibition every few years, and most members agreed with this idea in some form.

On the subject of special night rates, the panel was also in general agreement, Mr. Eccles feeling that there was a superficial attraction about it, but that metering equipment rather ruled it out at consumer level, and Mr. Wilkinson suggesting that the price difference from a daytime charge could reflect only the greater efficiency of generation at night. It might be as low as 0·05d./unit less than the day charge. In any normal case, it would in any case be necessary to arrange day and night charges to give the same overall revenue.

Demonstration farms in rural areas, with farmers' loaned equipment, on the understanding that other farmers might be brought to see it was, on the whole, favoured, though it was felt that boards should be very selective about equipment dealt with in this way.

Earlier Discussions

Mr. J. ECCLES opened the discussion on Col. Leeson's paper, which we summarised last week. He queried whether those outside the industry realised how electricity could help in national prosperity. It was the duty of delegates to see that the outside world was as well informed as they themselves. He emphasised how little was at present being spent on electricity both in industry and nationally. Yet increased application of electricity would not automatically increase production.

Following up this theme, Mr. H. W. BOSWORTH suggested that every difficulty seemed to be put in the way of manufacturers. He called in particular for the abandonment of the expensive monopolies inquiry, for the abolition of restrictive practices by management and labour, and for the review of military service demands. Unless there was an ending of the penal taxation on undistributed profits, then the Government should finance long-term credit for overseas customers. Moreover, our own purchasing power should be used ruthlessly to obtain cheap entry for British goods into other countries. Mr. W. A. COATES, who spoke next, called for leadership rather than mere exhortation, while Mr. D. MAXWELL BUIST, who returned to the points made about electrical exports, warned of the danger of building up exports too energetically at the expense of production for the home market. Exports could increase, but so, proportionately, should home sales.

Mr. H. MIDGLEY forcefully claimed that there was plenty of bad exhortation in industry, especially from a small minority of the work people's leaders: what was wanted was equally successful good exhortation. Mr. W. H. DUNKLEY also wanted a change—more stimulus and reward for inventiveness. He thought that perhaps we relied too much on overseas sources of ideas. Mr. J. HARDING agreed with an earlier speaker that the Government should begin to help with long-term credit in the export market.

Industrial Production

Mr. Wilkinson's paper and the three supporting papers were taken together for the purpose of discussion on Thursday morning. Amongst the early speakers was Capt. J. M. DONALDSON, who echoed contributors to Tuesday's discussion by calling for harder work. He emphasised that although thermal efficiency was gradually increasing, thermodynamical considerations set a definite limit to the saving of coal that might result.

Dr. J. N. ALDINGTON commented on the importance of lighting in industrial production, emphasising how low were present levels, and calling for designed values of 100 lumens/sq ft on the working plane as a contribution to maximum productivity and minimum operator fatigue. In connection with lamp efficiency, he suggested that in designing installations attention might be paid to the inevitable thermal output of the lamps as a contribution to the heating load. Mr. R. A. S. THWAITES, who followed him, modified praise of the paper by Messrs. Johnson and Holder with regret that it did not give more attention to diversity.

He himself favoured some transfer of some of the fixed charge into the running component of a tariff, so as to benefit low-load factor consumers who necessarily offered a good diversity.

Mr. BRYAN DONKIN turned to the paper on heat electric generation, suggesting that the authors had taken too high a temperature for steam extraction from their back-pressure turbines. In any case, he thought that domestic heating was the best basis for the application of steam-electric generation: in many possible industrial applications the probable saving would not justify the expenditure of capital necessary. He suggested that the B.E.A. should go ahead with district heating schemes for industrial premises.

Mr. A. M. F. PALMER enlivened the proceedings with a provocative contribution in which he attacked some previous speakers, offering it as a fact that it was the countries with the lowest standards of living that worked the longest hours. He thought the particular merit of the papers under discussion was that they emphasised the readiness of the electricity industry to play its part in the drive for intensive mechanisation. Active publicity, and the freedom to practise it, would be necessary, however, to overcome the resistance of industry.

Mr. H. W. SWANN stressed the merits of "pegging' fault-current levels by agreement as supply systems grew. This could, with advantage, apply at distribution as well as transmission level. Mr. J. I. BERNARD suggested that the case against private generation by diesels was even more convincing than was suggested by Messrs. Johnson and Holder. Mr. A. N. IRENS, speaking of higher productivity in America, suggested from his own observations that the difference was not so much the amount of mechanisation provided, but in the intensity of use of the available machines. The prevailing British practice of one machine, one man, was wrong.

Mr. J. W. MOULE advocated electric floor heating as a desirable off-peak load which had many advantages in terms of installation and running costs. Miss M. V. GRIFFITHS thought it a pity that the authors of the papers had so readily dismissed the heat pump: she considered it unwarrantable to assume that the heat pump was not suitable for district heating.

1. The President and principal guests before dinner. 2. Sir John Hacking and Lord Citrine chat with the Mayor of Torquay, with Mr. A. M. F. Palmer in the background. 3. Messrs. W. Trace and J. Eccles together at Tuesday's reception. 4. Messrs. H. J. Mellows and F. C. Fenton with their ladies on Tuesday

Ambitious Plan for Nigeria

But many difficulties have yet to be overcome

AN inordinate number of difficulties faced the Electricity Corporation of Nigeria during its first year of operation. The strenuous measures needed to eradicate many of these, and the ambitious plans for promoting the extensive development of electricity production and utilisation in the colony, are outlined in the Corporation's 1951/52 report, to hand.

Formed in 1950, the Electricity Corporation of Nigeria—a Government sponsored body—inherited numerous small undertakings scattered throughout the colony, many of which were in a poor state both mechanically and financially. There was also a large and growing unsatisfied demand for electricity, and it was early considered essential to plan the development of the natural resources of the country.

Some difficulties

An early problem was that owing to the difficulty of arranging satisfactory contracts for building work, plant on order for six small stations is expected to arrive before the buildings can be provided to house it.

The most important project taken over by the Corporation is the Ijora "B" power station, to serve Lagos, for which two 12·5 MW sets with a possible two 25 MW units later, were originally planned, but it was subsequently discovered that the foundations were unsuitable, and it was decided to construct the station on a buoyant concrete raft. The inevitable delay means that the first set at Ijora "B" will not be ready before the end of 1954. Another steam station with two 5,000 kW sets is being erected at Enugu, for which plans were also changed because of restricted cooling water.

At the cable jointing school

Yet despite these setbacks, it is clear that good progress is being made in the complete rehabilitation and expansion of the supply industry. A building and civil engineering department has been set up to undertake work which was formerly carried out for the undertakings by the Public Works Department.

The Corporation has also started its own school for training African cable jointers, which is proving successful. A commercial department has been formed and an installation section is in the embryo stage. Regulations are being prepared for a National Register of Electrical contractors, with the Corporation responsible for holding wiremen's examinations.

Turning to the operations for the year, output was increased by 30% to 66 million units, and the number of consumers rose from 31,310 to 36,939. Residential consumers purchased nearly 20 million units at an average cost of 2·380d. per unit. But the year's working resulted in a deficit of £84,000, due primarily to the fact that most of the undertakings established by the Government, and now acquired, were not self-supporting and were, in fact, established as amenities.

Development Plan

The chairman, Mr. J. Houston Angus, agrees that charges are higher than elsewhere, but he considers that they are not unnecessarily so, in view of the increased costs, which have to be absorbed. He believes that the only real way of lowering the tariffs is by developing the hydro potential of the country, which appears to be considerable, particularly in the River Niger and in the Cameroon Highlands. In this connection a number of schemes are under consideration, in addition to a proposal to establish a 90 MW pithead steam station at Asaba to avoid the high freight charges on coal.

In conjunction with this station there would be a 220 kV transmission line to Shagamu from where a 132 kV line would run to Ibadan and Lagos. It is envisaged that if this project becomes economically feasible the 220 kV line may ultimately extend to Lagos, and an interconnecting 132 kV and 33 kV system would be established. For this impressive scheme it is estimated that a sum approaching £40 million would be required by 1960.

PROBLEMS AND PRACTICE in Engineering

Surge Protection

MANY substations are connected by way of an overhead line and one form of surge which is responsible for breakdown or failure of electrical plant and equipment is the sudden transient high voltage wave set up as the result of a fault. The transient voltage, or surge, travels along the line and will ultimately reach a substation or perhaps a terminal point affording a works' supply where it may give rise to danger.

The effect may be greatly minimised at the remote end by making use of the reflection which occurs when the characteristics of the transmission line change abruptly. At such a point, secondary waves are set up, which are propagated along the line in both directions, and the voltage transmitted into the new section is the sum of the original voltage and the reflected wave.

If the surge impedance of the new section is greater than that of the original line, a voltage rise takes place, the transmitted voltage lying between its original valve and twice that amount. Should the surge impedance of the new section be less than that of the original section, the voltage will be reduced and a current rise takes place.

Since cables in general exhibit a much smaller impedance than overhead transmission lines, it follows that the inclusion of a short length of cable between the end of the line, and the transformer or switchgear as the case may be, may afford a certain degree of automatic and simple protection against surges.—*C.B.Y.*

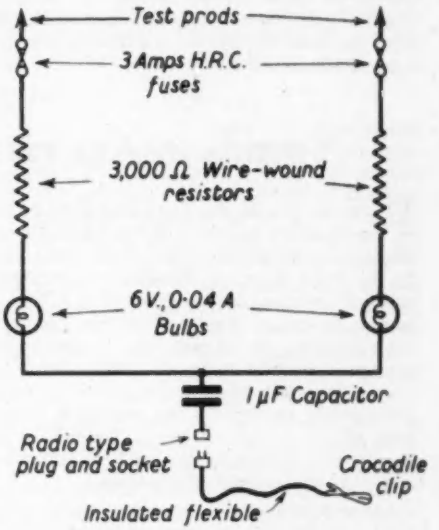
"Three-in-one" Tester

THIS instrument is an attempt to eliminate the dangers sometimes associated with the use of the ordinary type of "mains test lamps." It has been designed primarily for use as a mains test lamp, on both d.c. and a.c. supply systems from 100 to 500 volts, and provided the phase voltages are not excessively unbalanced it may be used as a phase sequence indicator on 25 to 60 c/s a.c., 3-phase, 4-wire supplies in which the neutral point is earthed and the voltage between the lines is from 200 to 440 V. It may also be used to indicate whether the supply is a.c. or d.c. where the line to earth voltage is from 150 to 250 V.

The fused test prod requires some explanation as to its construction. For materials, the body, gland nuts, retractable shield and insulated disc can be made from any suitable insulating material, while other parts are as described below.

When the top gland nut is screwed down the rubber washer tends to expand both outwards and inwards. It is prevented by the metal cup (in which it is partially enclosed) from expanding outwards and fouling the threaded portion of the prod body. The rubber washer therefore firmly grips the whole cable and takes any inadvertent strain off the copper conductors.

As will be seen, the splayed copper conductors are securely held between a small brass washer and a brass-headed drawing pin

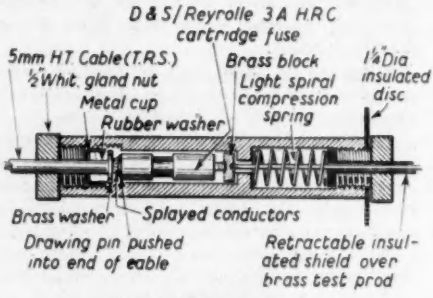


Circuit diagram of the "three-in-one" tester. The 6V lamps are those used in cycle dynamo rear lights

inserted in the end of the cable. This method eliminates soldering but at the same time ensures good contact between the copper conductors and the end of the fuse cap. The fuse is an ordinary D & S/Reyrolle 3 amp h.r.c. type as fitted in the D & S/Reyrolle fused type plugs. It is screwed into a small

brass block to which is attached the hard brass test spike.

All the components in the set have been housed by the writer in a flat box approximately 6 in. by 4 in. by 2 in. In one of the larger sides, two holes have been cut through which the lamps may be viewed. Cable entry from the test-prods is through gland nuts,



Details of the test prod

similar to those on the prods, but slotted longitudinally so that as each is screwed up it grips the cable insulation, which ensures there is no strain on the conductors.

The manner in which the tester may be used for its various purposes is indicated as follows:

Mains test lamp.—Using the safety type test prods proceed as when using the ordinary type of mains test lamp.

Phase sequence indicator.—Connect one end of the earth lead by means of the crocodile clip to earth and the other end by means of the plug to the "radio" type socket. Connect one test prod (marked red) to the red phase of the supply and the other test prod (marked white) to the white phase of supply. It will be noticed that one bulb burns brightly and the other bulb is dull. If the bulb connected to the red phase is the brighter one, then the phase sequence is R-W-B. If the bulb connected to the white phase is the brighter one, than the phase sequence is R-B-W.

Test whether supply is a.c. or d.c.—Connect earth lead as for phase sequence test. Connect either test prod to the "live" side of supply, and if the bulb connected to the live side lights, then the supply is a.c. If no light is observed then the supply is d.c.—*E. R.*

Trends in American Lighting Practice

IT was an entertaining and informative evening spent by members of the Illuminating Engineering Society last week at a lecture given by Dr. Ward Harrison, President of the International Commission on Illumination (C.I.E.), and an American lighting consultant. Discussing American lighting practice, Dr. Harrison presented a broad review of current trends in his country, from which two main factors were immediately noticeable—the wholesale adoption of fluorescent lighting, coupled with a universal acceptance (by the lighting engineer) of higher levels of illumination.

More than half of present-day indoor lighting in America uses fluorescent lamps. Moreover, when new installations are planned, the planning is based solely on fluorescent fittings. This naturally involved problems of colour rendering, especially in the home. There are three lamp colours which rank the most popular—"daylight," "cool white" (which corresponds most nearly to the English "daylight" colour) and "warm white." The last two colours are also available in "de-luxe" versions, having a greater red content to improve the appearance of complexions under this lighting. There was, moreover, a continual increase in the lamps operating without starters—due to the low value, 110 V, of the standard voltage of the American supply. This necessitated the use of transformers, giving a secondary voltage of 400 V or so which brought in its train the use of instantaneous starting to minimize control gear.

Turning to the problems imposed by the general trend towards higher illumination levels, Dr. Harrison rated as the most troublesome that of glare. Evaluation of glare was the greatest difficulty but the improving agreement between results of experiments on glare evaluation was not only encouraging but tended to substantiate the speaker's own concept of "Glare Factor" which he introduced to this country some time ago.

It also became obvious that the area of light source to which the eye was exposed gained increasing importance as illumination levels rose. It was a factor which ranked as high as that of contrast between directly and indirectly lit surfaces. The sole criterion of glare lies, however, in the physical comfort afforded by the installation.

18 JUNE, 1953

Starting Power for the COMET

DEVELOPMENT of Comet jet aircraft, particularly Comets II and III, brought with it problems of providing sufficient power for the engine starter motors. With present day aircraft, such motors are required to develop approximately 100 b.h.p. but for Comets II and III, having "Avon" engines of 9,000 lb static thrust, even larger starting powers were required. Moreover, ground starting units had to operate not only in the U.K. but on any airfield served by these Comets, which added further requirements of operation under widely differing atmospheric conditions.

To overcome these problems, Auto Diesels Ltd., in conjunction with Crompton Parkinson Ltd. and using a newly-developed Leyland engine, have produced a diesel generator set which last week was demonstrated starting Comet I "Ghost" engines at London Airport. The unit they have developed is for dual-voltage operation, designed to supply not only starter motors but power for the aircraft's services. Two supplies at 28 V and 112 V were required as the latter voltage is now the International Standard for aircraft engine starting, whilst the former is used universally for the aircraft's services and, in addition, for starting on many aircraft engines in use at the present time.

Prime Mover

The Leyland engine used is an 11.1 litre, six-cylinder unit, of the totally enclosed, cold starting, vertical type. Its maximum rating of 154 b.h.p. at 2,000 r.p.m. at n.t.p. eliminates any need for super-charging at the maximum load likely to be encountered. Mounted on a common, fabricated steel bed-plate, the engine is directly coupled through flexible couplings to the two Crompton Parkinson generators. These are standard industrial type compound wound machines, designed with low armature reaction and compounding to provide close voltage regulation without the use of a.v.r.'s. In practice, the degree of over-compounding which has been achieved allows for voltage drop in the cables to the starter motor.

Shown above is the starter unit in use on a Comet I

Generator Ratings

Rated at 21 kW, the lower voltage generator supplies 750 amps at full load, rising to a peak overload of 2,000 amp. During the demonstration, the peak current reached 1,300 amps, the potential, measured at the generator terminals rising to approximately 29·5 V. On the 112 V side, the generator is rated at 44·8 kW, 400 amps and has an overload capacity of 800 amps. Both generators may be used simultaneously, one for starting and the other for services, and under these conditions the maximum power available is 100 kW, shared between the two machines. Whilst the set is running, each generator charges a battery, a 24 V unit from the 28 V machine, and a 96 V battery from the high voltage generator. The purpose of these batteries is to provide auxiliary power for services and starting when the engine and generators are not running. This is most likely whilst refuelling when all machines near the aircraft must be stationary.

Protection is provided for three major purposes—overload, generator over-voltage and reverse current, isolation effected by two 400 amp single pole solenoid-operated contactors. Protection against over-voltage is provided to prevent damage to rectifiers in the aircraft from which its own d.c. supply is obtained, whilst reverse current protection guards against the aircraft's own supplies feeding back.

overseas news

More Plant for Nova Scotia

With local hydro resources almost fully developed, the Nova Scotia Light and Power Co. is planning to rapidly expand its steam generating plant capacity. At the Water Street station the erection of a 220 k lb/hr boiler commenced a few weeks ago and a 20,000 kW turbo-generator is on order. Details are also being completed for a 300 k lb/hr high-pressure boiler which it is planned should be operating in 1955. Preliminary planning for the addition of a further 60,000 kW of steam plant to be installed about 1957, is well under way, Mr. J. C. MacKeen, the president, reports. In addition, a site has been purchased at Tufts Cove on the Dartmouth side of Halifax harbour for power station requirements.

Development in Newfoundland

The utilisation of hydro-electric resources in the area is the aim of the Newfoundland Light and Power Co. which reports that a new 7,500-h.p. water and power plant at Cape Broyle started operations earlier this year. A 10,000-h.p. hydro-plant on the Horse Chops River above Cape Broyle should be ready for operation by autumn of 1953, and additional storage dams and diversion canals to increase the water supply for these hydro-plants will be built in the current year. If the present trend of growth in the use of electricity continues, another generating station will have to be ready for production in about three years, the president, Mr. D. Stairs, reports. The Piper's Hole River can be made to produce, by the development of three sites, about twice as much power as was used in the St. John's area in 1952, and the company has applied for the right to develop this river by stages as the demand requires.

Chief Joseph Contracts

The English Electric Co., Ltd., has been given the contract to supply ten transformers for the Chief Joseph dam on the Columbia River. They are 103·3 MVA single phase transformers for connecting in three 310 MVA three-phase banks, ratio 230 KV/13·2 KV (one transformer is a spare). The firm's bid of $442,751 (the lowest submitted), to which we referred on June 4, has been accepted by the U.S. Army Corps of Engineers. But the order for the four 100 MW generators for the same scheme has gone to the Westinghouse Electric Corporation, at a figure of £1,517,000 as against the English Electric Co.'s revised tender price of £1,570,000. This is the equipment regarding which there was much publicity when the English Electric Co. submitted the lowest tender, only to be rejected in April last after much discussion.

Work on Karnafuli

The waters of the river Karnafuli were directed into a diversion canal at Kaptai, site of the Karnafuli hydro-electric project, recently. To enable construction work on a dam at Kaptai, it is planned to build two coffer dams, which are expected to be completed before the monsoon starts. The Karnafuli scheme is one of Pakistan's development projects and will be visited by the World Bank Mission which is arriving in Pakistan next month, to assess her foreign exchange needs.

The Trombay Scheme

The fears of the Tata Power group in regard to the proposed Trombay power station (this page, May 7 issue) seem to have been well founded. Although the formal application notice, just published, refers to the project as comprising two 50 MW generators, with ancillaries, it is locally understood that the Bombay government has just recently decided only to permit the Tata organisation to undertake the first stage of the scheme involving one set.

Position in Madras

The steam power station at Basin Bridge, Madras, is now being expanded and, along with the steam-hydro-electric grid, is meeting the needs of the textile mills at Coimbatore. Pointing this out, the chief engineer of the Government Electricity Department, Mr. Ramamusthu, states that our note on April 23 was incorrect, for supplies to the mills have been maintained with the aid of the various stations, despite the recent water shortage in the area. The hydro-thermal-grid comprises the four hydro-stations, Pykara (43 MW), Mettur (40 MW), Papanasam (28 MW) and Moyar (12 MW at present and 36 MW when extensions are completed), and two steam stations—Madras city (48 MW at present with a further 15 MW set under erection) and Madhurai (11 MW). In addition, a 27·2 MW extension to the Pykara station is in progress. He also states that no new thermal station is contemplated for Coimbatore, but if the pilot scheme now in progress for extracting lignite in Neyveli, in South Arcot district, proves successful, the Madras Government may construct a thermal station nearby.

Extension Planned

Although additional plant, already on order, is expected to be erected and running within the next twelve months, the George Municipality (Cape Province) has decided to provide for the installation of yet further plant to be ready by about

1956. This will consist of two 3,000 kW sets with boilers, the specifications for which are now being drawn up by the Council's consulting engineer (Mr. J. S. Clinton of Johannesburg). At present the George station houses two 750 kW Bellis and Morcom turbo-alternators and one 1,500 kW Brown Boveri, with three Babcock and Wilcox boilers. The plant expected to be ready within twelve months is a 1,500 kW Metrovick set with its accompanying Babcock and Wilcox boiler. The Council's electrical engineer is Mr. P. H. Newcombe.

Temporarily Open-air Plant

Originally it was planned to have Escom's Salt River No. 2 power station at Cape Town in service for the winter of 1954, but manufacturing delays, due particularly to shortage of steel, have made this impossible. The steel-framed buildings are less advanced than they should be with the result that the boiler contractors (Messrs. Babcock and Wilcox) are being delayed. In view of the urgent need of additional plant, arrangements are being made with the boiler contractors for the first two boilers for the No. 2 station to be erected "in the open." By this means it will be possible to supply steam to the No. 1 station to assist the boiler plant there and make full use of the turbo-alternator plant installed. It is anticipated that widespread power cuts in 1954 can thus be avoided.

Persia's Order

A further indication of the strong export efforts of German manufacturers is the report that the director of Persia's Five Year Plan has signed an agreement with a German firm for the purchase of 30 electric power plants, 32 transformers and 42 km of h.t. cables. These goods are to be paid for during the next three years, it is stated, the delivery period ranging from six months to two years.

Rural Extensions

Two 750 kW generating sets were recently installed at the Brown Mountain hydro-electric scheme of the Bega Valley County Council New South Wales, bringing the capacity of that station to 1,950 kW. This is in addition to two diesel units at Bega and Narooma. At the official ceremony recently, Mr. J. B. Renshaw, Minister for Works and Local Government, said the next phase of development would be the installation of two 1,000 kW sets at the Brown Mountain power station. The Council is rapidly advancing its plans to supply electricity to every corner of its 3,650 square miles of territory, utilising the government's subsidy scheme. There are now 5,000 consumers among the aggregate population of 20,000. At present the Council is being paid, over the prescribed 10 years, subsidies totalling £72,187 towards extensions in various districts amounting to more than £175,000 capital cost, and representing nearly 1,400 new consumers of whom 500 are farmers. Subsidies totalling another £10,500 have been approved additional extensions, with a capital cost of £29,000 and representing 204 new consumers. In addition, the Council has applied for further subsidies totalling £19,387, to serve 310 new consumers, and representing capital costs of £43,252.

Installation Inspection

The regular inspection of consumers' electrical installations was the subject of a report by Mr. J. C. A. Fraser, deputy-general manager of the Sydney County Council's Electricity Department, which the Council earlier this month decided to reconsider at a later date. Mr. Fraser reported that the Government would probably consider reintroducing an Ordinance to make regular inspections by the Council mandatory. The previous Ordinance, which was repealed in 1942, required supply authorities to inspect consumers' installations for defects at least every seven years. According to the report, periodic inspections would cost the council about £120,000 a year. The total cost to consumers, including the cost of repairing defects in installations, had been estimated at about £250,000 a year. At the Council meeting, one member maintained that the consumers should be responsible for having their installations inspected every seven years, and licensed electricians should make the inspections.

Suggestions Rejected

After studying a consulting engineer's report on the alleged smoke-grit nuisance at the City Council's power station, the Brisbane Transport and Electricity Committee has rejected a recommendation that suitable smoke cleaning plant should be installed at the new Tennyson power station at an estimated cost of £300,000. The consultant's report said that, with the reduced demand on overloaded New Farm when the second 30,000 kW generator at Tennyson was commissioned, probably in 1955, the soot nuisance would be substantially reduced. Very few complaints were received about the soot until New Farm began to carry excessive loads some years ago. Boilers installed at New Farm before 1939 were designed for coal with an ash content of 12%. The Tennyson boilers have been designed for 23% ash.

N. Borneo Expansion

To cater for local development a new power station is being erected at Jesselton, in British North Borneo. The existing station is of 500 kW and has been overloaded for a long time. Orders were placed some time ago for three 500 kW English Electric alternators driven by diesel engines for the new station, and the first of these is expected to be shipped within the next few months, and the remainder at short intervals. With this new plant it is expected that the station will be able to provide a fair margin for future development. In any event, the plans of the new station will permit the installation of further sets up to a total capacity of 3,500 kW.

PERSONALITIES

IN THE INDUSTRY

Inducted as president of the Association of Mining Electrical and Mechanical Engineers for the year 1953/54 at the Association's annual Conference at Scarborough last week, was **Mr. J. Vaughan Harries,** M.I.E.E., who has been district manager with the Brush Electrical Engineering Co. since 1945. He became a colliery electrician after the first World War, and in 1928 was appointed chief electrician at Lady Windsor Collieries. Joining the South Wales Electrical Power Distribution Co. in 1931 as an electrical engineer in the Frequency Change Dept., he was later transferred to the Commercial Department of the Company, dealing with bulk supply contracts. He serves on a number of technical committees, including the I.E.E. Utilisation Section.

Mr. J. Vaughan Harries

Chosen for the post of station superintendent at the new Connah's Quay power station, Merseyside and North Wales Division, B.E.A., is **Mr. J. Evans,** who, since August 1950, has held a similar position at the Blackburn Meadows power station, Yorkshire Division. He takes up his new duties on August 1 next.

Mr. R. J. Bellis, Grad.I.E.E., has been appointed first assistant district engineer with the Yorkshire Electricity Board, Grimsby Sub-Area, Gainsborough. He was previously assistant section engineer in Oswestry, No. 4 Sub-Area, Merseyside and North Wales Electricity Board. He obtained his early training in the Meter and Test Department of the former North Wales Power Co. Ltd., and after war service became assistant mains engineer at Whitchurch, which position he held at vesting day. On leaving Oswestry recently, Mr. Bellis was presented with a gold wristlet watch by Mr. F. O. Harber, district engineer, on behalf of the staff and his former associates.

To succeed Mr. P. Morrell, M.B.E., A.M.I.E.E., who recently retired, **Mr. E. Forth,** B.Sc., A.M.I., Mech.E., has been appointed generation engineer (operation) for the Northern group of power stations in the North Eastern Division, B.E.A. Mr. Forth's place as generation engineer (operation) in charge of the Division's Southern group has been taken over by **Mr. J. McCrum,** formerly chief assistant mechanical engineer (construction), who prior to vesting day was station superintendent at Sunderland generating station.

Mr. A. R. Driessen, O.B.E., commercial manager of the Indian Cable Co. Ltd., has been appointed chairman and managing director, in succession to **Mr. D. J. McIntosh** who has retired. Before being appointed commercial manager in August last year, Mr. Driessen was Eastern Area branch manager in the United Kingdom for British Insulated Callender's Cables Ltd. He joined the former British Insulated Cables Ltd. as manager of the sub-office at Ipswich in 1944.

Mr. A. R. Driessen

Sir Geoffrey Summers, Bt., C.B.E, O.St.J., a director of John Summers and Sons Ltd., has been appointed a part-time member of the Merseyside and North Wales Electricity Board.

The Brush Group has announced the following Group accountancy appointments:— **Mr. D. N. Dow,** B.Com., C.A., A.C.W.A., until recently personal assistant to Mr. I. T. Morrow, C.A., F.C.W.A., deputy managing director of the Brush Electrical Engineering Co., Ltd., becomes secretary to the National Gas and Oil Engine Co., Ltd., in succession to **Mr. Harold S. Colls,** A.C.A., who is now chief internal auditor to the Group; and **Mr. R. H. Irwin,** A.C.A., lately attached to the accountancy staff of the Brush Electrical Engineering Co., Ltd., becomes an assistant to Mr. Colls.

The Visco Engineering Co., Ltd., announce that the founder and chairman, **Mr. F. Curt Smith,** after thirty-two years with the company, has now retired from active participation in the business. **Col. G. Mallett,** M.C., T.D., has been elected to the chairmanship in his place. **Mr. Fred C. Smith** will continue as managing director. The company was founded by Mr. F. Curt Smith in 1921 to develop the "Visco" air filter, the first all-metal filter using oil film covered surfaces to be placed on the English market, but since then the range of manufactures has been considerably extended.

Mr. F. Curt Smith

Formerly boiler house superintendent at Stuart Street power station, North Western Division, B.E.A., **Mr. T. W. Maughan,** M.Inst.F., has been promoted to deputy station superintendent there, in succession to Mr. F. Dewhurst, A.M.I.E.E., A.M.I.Mech.E., who, as we exclusively reported on March 19, has become station superintendent at the new Chadderton power station. Mr. Maughan served an apprenticeship with Laurence Scott and Electromotors and studied at Manchester College of Technology. He started his career in the industry in 1930 as a junior engineer at Stuart Street power station, and subsequently had a short period at Barton as control engineer before returning to Stuart Street as boiler house technical assistant. He became senior control engineer at Barton in 1943 and was appointed boiler house superintendent at Stuart Street in 1948.

Mr. T. W. Maughan

The following have been elected as officers of the London Student's Section committee of the I.E.E. for the 1953-54 session: chairman, **Mr. M. H. Alder,** B.Sc. (Eng), of Standard Telephones and Cables Ltd.; vice-chairman, **Mr. R. Thomas,** B.Sc. (Eng) of Sperry Gyroscope Co.; and hon. secretary, **Mr. M. C. Cubitt,** of Pye Ltd., with the following as hon. assistant secretaries: general, **Mr. M. H. F. Collins,** (B.T.H. Willesden); visits, **Mr. A. J. Bennett,** (Mullard Radio Valve Co.); entertainments, **Miss A. Reading,** B.Sc. (Eng), (G.E.C., Stanmore); and **Mr. J. H. Zimmerman,** (G.P.O.); Section editor, **Mr. A. G. Helyar,** (Siemens Brothers and Co.); and hon. treasurer, **Mr. R. Hoseason,** (London Electricity Board).

Commercial manager of the Equipment Division of Mullard Ltd., since December, last, **Capt. R. T. Paul,** C.B.E., R.N.(Ret'd), A.M.I.E.E., has been appointed a director of Telcon Telecommunications Ltd., by Mullard's in place of **Dr. D. B. Foster** who has resigned from the Board owing to pressure of work in other directions. Prior to joining Mullard last December, Capt. Paul had a distinguished career in the Navy, including acting as chief signal and radio officer to the Allied Naval C. in C., Expeditionary Force, and being responsible for the naval signal, radio and radar organisation for the Normandy invasion.

Capt. R. T. Paul

The end of this month brings the retirement of **Mr. Harold C. Sabine,** A.M.I.E.E., A.M.Inst.C.E. after over 47 years' service with the Tudor Accumulator Co. His early experience was gained with the North Metropolitan Electric Supply Co., and he joined the Tudor Accumulator Co. in London in 1906 as assistant outside engineer. There followed periods in charge of sales and technical work in Ireland and as district engineer at Manchester, prior to becoming, in 1921, district engineer for the whole of the north of England, dealing with sales and technical work for stationary and electric vehicle batteries, a position he has held ever since, apart from a period between 1944 and 1949, when he was on special sales and technical work in London.

Mr. H. C. Sabine

Following the recent acquisition of the Winnipeg Electric Co. by the Manitoba Government, a major reorganisation of the Manitoba Hydro Electric Board and the company's chief officials has just been announced. **Mr. E. V. Caton,** the former vice-president and chief engineer of the company, who became assistant general manager after the changeover, has retired, but continues to act as a special consultant. **Mr. I. A. Mahon,** sales and merchandising manager for the past 23 years, had also retired. In addition, **Mr. C. F. Lidster,** comptroller and treasurer of the company, and **Mr. S. N. Currie,** secretary, have also retired. As a result, a number of promotions, involving dovetailing of the Board and company departments, are announced. **Mr. L. M. Hovey,** formerly assistant to Mr. Caton, has been appointed manager of the system engineering and planning division. He will be responsible for the design and general engineering planning for both the company and the Board. His assistant is **Mr. A. S. Williams,** previously superintendent of the Seven Sisters power plant. In charge of operation and maintenance of all power plants and transmissions and distribution plants for both the board and the company is **Mr. C. P. Haltalin,** who has **Mr. A. L. Oddleifsson** as his assistant. Finally, **Mr. K. C. Fergusson,** general superintendent for the company's power plants, will also supervise the board's plants.

B.V.C. Industrial Constructions Ltd., have appointed **Mr. W. Bulloch,** A.M.I.Mech.E., to control all activities of their Hydraulic & Mechanical Materials Handling Department. For nearly 25 years Mr. Bulloch has been actively associated with the development of hydraulic and pneumatic ash and dust handling plants and since joining B.V.C. he has been employed in the development of the hydraulic ash handling plant.

A member of the commercial staff at the Headquarters Office of the Merseyside and North Wales Electricity Board, **Mr. A. E. Keddie,** B.A.(Hons.), F.R.Econ.S., F.S.S., has been awarded a fellowship to Harvard University, U.S.A. Two fellowships are awarded by the Harvard School of Business Administration, in conjunction with the British Institute of Management, with the object of contributing to Anglo-American understanding and co-operation in industrial development. The fellowships are for the regular Master of Business Administration Course, which is designed for specially selected young American executives who have already graduated from universities. Mr. Keddie was selected for one of these two fellowships from candidates nominated by the whole of British industry.

Mr. A. E. Keddie

A well-deserved honour has been bestowed upon **Mr. C. D. Le Maistre,** C.B.E., F.C.G.I., M.I.E.E., M.I.Inst.C.E.,—he has been given the Chevalier award of the French Legion of Honour. Mr. Le Maistre, who is well known for his work on international documentation, already holds another foreign honour, that of Kt. Com., second degree, of the Royal Swedish Order of Vasa. He has been general secretary of the International Electro-technical Commission for many years, and has recently had a serious illness, but we are pleased to be able to report that he is now rapidly improving. Although now in his eightieth year he hopes to be able to go to America next year for the jubilee meeting of the I.E.C. at Philadelphia.

Mr. G. E. Smith, M.A.(cantab.), has been appointed Contracts Manager to Brush Bagnall Traction, Ltd.

Four other appointments are announced by the North Western Division, B.E.A. Chosen as deputy station superintendent at the new Carrington power station is **Mr. J. C. Hodkinson,** A.M.I.E.E., A.M.C.T., who since April, 1951, has held a similar position at the new Westwood (Wigan) power station, and was earlier, for 15 years, at North Wilford power station. Secondly, **Mr. A. M. Whyte,** A.M.I.Mech.E., formerly deputy station superintendent at Walsall generating station, has been appointed to a similar position at the new Roosecote (Barrow) power station, as from July 1. Thirdly, **Mr. T. H. Exelby,** A.M.Inst.F., previously charge engineer at Ribble generating station, has been promoted to deputy station superintendent there in succession to Mr. A. Beckett, M.Inst.F. Finally, **Mr. A. Ball** has been appointed deputy power station superintendent at Wigan, where he was previously shift charge engineer.

Mr. Leslie Gamage, M.C., M.A., vice-chairman and joint managing director of the General Electric Co., Ltd., has been re-elected president of the Institute of Export, for the eleventh time in succession.

At the annual general meeting of the West of England branch of the Purchasing Officers' Association recently, **Mr. E. Stanley,** A.C.C.S., and **Mr. H. Hardman,** both of the South Western Division of the B.E.A., were elected hon. secretary and hon. treasurer, respectively.

Mr. Arthur Shaw has joined Dimplex Ltd., to handle advertising and sales promotion.

Mr. R. J. Kayser, manager of the Transformer Engineering Division of the English Electric Co. of Canada Ltd., has been appointed Canadian representative in the Transformer Committee of C.I.G.R.E. He succeeds **Mr. M. B. Mallett,** who has had to relinquish the post owing to his appointment as general manager to the company.

OBITUARY

Mr. Harry Arthur Campbell, M.I.E.E., for 24 years chief electrical engineer to the Jamaica Public Service Co., Ltd., died on June 6 at Kingston, Jamaica. An old friend of ours—he always called upon us when visiting Britain—Mr. Campbell was not only mainly responsible for the development of the electrical industry in Jamaica since the 1890's, but also played a part in the development of the city of Kingston itself. His tasks were not always easy, but he tackled them with enthusiasm and obtained fine results, particularly just prior to the second world war, when he had a busy time getting a supply to the outlying areas of Kingston, where mills and other works were being established. He was also, for a time, president of the Jamaica Professional Engineers' Association. He leaves many friends in this country who regret his passing.

Prof. D. Hanson, director of the Department of Metallurgy at Birmingham University, died on June 12.

Mr. P. T. Loosemore, O.B.E., town clerk of Plympton R.D.C., who died on June 15, promoted the council's Special Electricity Order, 1926, and subsequent Special Acts establishing the council's electricity undertaking.

Mr. W. Skipsey, A.M.I.E.E., transmission engineer of the North Eastern Division, B.E.A., since September, 1948, died on June 1, aged 51. Educated at Johnston Technical School, Durham, he started in the electricity supply industry with the Newcastle Co. in 1926 as a linesman. After work on substations and on power station shift control, he became assistant district engineer in 1938 and later, following a period as an assistant engineer at headquarters, was promoted to district engineer of the Blaydon district in 1945, North Eastern Electric Supply Co. Two years later he became assistant area engineer for the Central area, and after vesting day was appointed chief assistant transmission engineer of the N.E. Division.

Electricity in Mining

A.M.E.M.E. CONFERENCE REVIEWS PAST DEVELOPMENTS

THE Conference of the Association of Mining Electrical and Mechanical Engineers, which met in Scarborough last week, found itself in a reflective mood. It was a mood sustained by technical papers presented on Friday, after an initiation by J. Vaughan Harris, M.I.E.E. in his Presidential address. In it were discussed activities of early craft-guilds and their contemporary counterparts to illustrate the President's theme of "Recognition."

Early fraternities might be categorised into three types, religious guilds, merchant guilds and craft guilds. The latter concerned themselves with the more worldly arts, crafts and economies and usually comprised apprentices, craftsmen and masters in a single branch of industry. Although their structure changed with circumstances which led finally to their dissolution, there is little doubt that these companies were the forerunners of schemes for scientific research and technical education.

The President then reviewed the history of this country's three major engineering institutions, of civil, mechanical and electrical engineers, with the purpose of showing that his own Association had no need to be discouraged by inability to gain royal recognition, and that these institutions, like the A.M.E.M.E. changed their titles to suit altered circumstances. This review led, not unnaturally to a discourse on the foundation and growth of the A.M.E.M.E. itself.

This reflective mood showed itself again in the paper by C. A. Ritchie, F.A.M.E.M.E., and J. N. L. Woodley, B.SC., M.A.M.E.M.E., which reviewed progress in distribution and control of underground electrical equipment.

First Use for Electricity

When it was first introduced, about 60 years ago, electrical energy was regarded as a supplement, rather than alternative, to compressed air, except for low power supplies some distance from the shaft. Moreover, generation at collieries was individualistic, although almost invariably at 500 V. Transmission was by way of v.i.r., run on porcelain insulators or cased in wood, inbye switches were of the knife pattern mounted on wood or slate whilst motors usually took the form of open yoke types with Gramme armatures. By 1905, however, experience of electricity had become so extensive that it was now used exclusively.

Not unnaturally such wholesale choice of electricity demanded some rationalisation of electricity supply. Using the German development of two and three phase supplies, power stations were built to supply groups of collieries using h.v. lines, with substations at collieries transforming the voltage down to 500 V. It became apparent however, that this voltage was too low for colliery distribution, necessitating a further major reorganisation, as soon as reliable insulating materials were available for higher voltages.

Switchgear and Fault Capacities

One of the features of this development was that fault capacities of supply systems were low, resulting in a more than adequate performance of switchgear and cables then in use. For this reason, primitive control gear retaining hand operation, held continued sway until the coming of the Grid System brought with it much higher fault capacities. Other reorganisation was necessary due to the standardisation of frequency, permitting rationalisation of motor frame sizes and speeds, the closure of a large number of small economic colliery power stations and an overall increase in demand following further mechanisation.

The formation of the National Coal Board effected again large scale reorganisation, coupled with a need for more powerful face machinery. Although this meant an increase in consumption the most significant effect of the introduction of this equipment was the increase in maximum demand which showed a future problem as yet difficult of solution.

Before concluding their paper by discussing future trends, the authors considered the safety aspects of electrical equipment. Accidents, it seems, were still due in the main to carelessness or foolishness. Although protection should guard against mistakes as forgetfulness, it should not embrace the operator who set out to evade the protective system.

Later in the day the Association considered a paper by H. E. Collins, C.B.E., M.ENG., discussing mechanical engineering developments in mining. This paid particular attention to continuous mining as opposed to the present-day cyclic system. Professor Granville Poole, B.SC., F.G.S., delivered the fifth "W. H. Thornton Lecture" discussing Dr. Thornton's work and mine explosions.

British Standard Specifications

Portable Electric Hand-lamps (open type with protective guard). *B.S.* 1980: 1953. *Price* 2*s. net.* In view of the many satisfactory hand-lamps of this type which are available, this new standard deals with this subject in a manner which, although somewhat general, will ensure safe, reliable products if followed. Requirements are specified for hand-lamps for general use on supplies above 24 V a.c. (r.m.s.) and 50 V d.c. but not exceeding 250 V, excluding those situations where flameproof, gastight, watertight or dust-type units are necessary.

Lead and Lead Alloy Sheaths of Electric Cable. *B.S.* 801: 1953. *Price* 2*s. net.* A revision of the original 1938 publication, this standard covers a smaller range of alloys. Whereas the earlier edition specified pure lead and four lead alloys (increased to five in the 1942 amendment slip), the present issue refers to lead and only three of its alloys. Methods of analysis (given previously) have been omitted, whilst the fatigue data included earlier have been replaced by an appendix giving guidance on cable types and service conditions for which particular alloys are most suited.

Screen Luminance (Brightness) for the Projection of 35 mm Film. *B.S.* 1404: 1953. *Price* 5*s. net.* Extensive measurements and investigations have been carried out since the first edition of this standard was issued. In fact, in conjunction with the Morgan Crucible Co., the Ship Carbon Co. of Great Britain and the Research Laboratories of the General Electric Co., measurements were carried out in thirty-three cinemas, covering all types of auditorium. As a result, a more specific value of screen luminance has been laid down and a standard method of measurement developed. It is thought that this B.S. is now more comprehensive in its requirements than that of any other country. The standard includes, as an appendix, a full report on the measurements made in the cinemas.

Lighting a Steelworks

MORE than 700 industrial fittings, together with some 500 watertight units, have been installed in recently completed extensions to the Shotton, Cheshire, steelworks of John Summers and Sons Ltd.

Most of the fittings were supplied by the Wardle Engineering Co. In the Cast House, in which are found the blast furnaces, it was decided to use this company's "Workslite" industrial type reflector fittings, 100 being installed. To facilitate erection many of these units, mounted on roof trusses, were fitted with tops designed for easy wiring. Colour blended sources, consisting of triple groups of reflectors housing one 1 kW tungsten filament lamp and two mercury vapour discharge lamps provide the main source of illumination.

Outside, open-type "Solar" street lighting lanterns, employing 140 W sodium discharge lamps provide illumination for access roads and sidings. The use of monochromatic source of low-surface brightness has been designed to provide largely shadowless illumination to ensure maximum safety for vehicles. Sodium units, 28 in all, have also been used in the heat exchange house.

These photographs show the Cast House, below, with the furnace bottom in the distance and an exterior view of the works, right

Plastics at Olympia

New Materials and New Applications in Evidence

THE facts that plastics have now regained their popularity and the plastic industry is now one of the most rapidly expanding of all industries, with a production rate of 190,000 tons a year, six times greater than 1938, and an export figure of £13½ millions for last year, are good reasons for the importance of the Second British Plastics Exhibition which finishes at Olympia today.

Eye-catching exhibits this year included several extra large mouldings. A 30-ft glider wing and a 14-ft radar reflector, made in impregnated asbestos, were fabricated by F. G. Miles Ltd., for the British Gliding Association, and A. C. Cossor Ltd., respectively, whilst a static water tank and a car body were made from glass fibre mat bonded with polyester resin. The latter was exhibited on the Bakelite stand.

Electrical Components

Exhibits of interest to the electrical and radio trades included exhibits of the etcher's technique applied to guided missiles—laminates which consisted of copper foil on paper or silicon glass base for the production of printed circuits by the etching process of important application in "miniature" equipments. This exhibit was featured by Ashdowns Ltd., who also showed silicon-bonded glass fibre for high-temperature insulation up to 250° C or 300° intermittent. Important exhibits were the Ashlam synthetic resin bonded boards for electrical insulation work and s.r.b. paper mouldings for refrigerators.

Bakelite and Vybak materials and their developments featured on the firm's stand included many moulding components, laminates and insulating varnishes which have application in the electrical industry and, of course, the car body to which we referred.

"Geon at Work," theme of the British Geon Stand, included applications of Geon P.V.C. in cable covering where it will resist oil, grease, petrol, and most acids, and will not burn. It is an excellent dielectric, is easily self-coloured, and is tough.

Main feature of the B. I. P. Streetly displays were mouldings in polyester glass fibre, demonstrating low-pressure moulding with contact resins for bonding glass fibre. Melamine table-ware is another new development.

One facet of the E. K. Cole organisation is its plastics engineering and moulding service. Apart from moulding cabinets for Ekco radio receivers, the firm make them for other manufacturers, and typical examples were shown. Electrical components ranged from panels for "Avo" multi-range meters to heavy-duty plugs and sockets able to withstand the passage of a lorry. An interesting exhibit not quite in our field was the firm's latest venture, a Polystyrene bird-cage.

Fibreglass, well known to our readers, is now finding application in boat building, in car bodies and roof lights. Samples of the material included glass cloth, chopped strand mat, diamond mat, roving and surfacing mats.

In the equipment on the G.E.C. stand two types of ovens for the preheating of thermosetting materials prior to moulding were shown. The first, a mobile G.E.C. 2 kW plastic preheating generator, depends on high-frequency dielectric heating. The second, a small preheating oven intended to stand on a bench alongside the moulding press, employs radiant heating by resistance elements.

Welding of Plastics

The display on the stand of Radio Heaters Ltd. included the latest Radyne thermoplastic sheet welding equipment. Two new Radyne press welders were on display. The new thermoplastic press welders deliver 2 kW and 4 kW output respectively. Both units are available for foot-pedal or pneumatic operation.

Main features of the Telcon stand were Telcothene powder and coated papers. Applications of this material included Telcothene rod, tubing, sleeving and moulded articles, all of which are important where resistance to corrosion or electrical insulation is important.

Tufnol, the resin-bonded laminate well known to readers, was displayed in many forms and shapes. Sheets, tubes and rods and a selection of components were on view.

The wide field of the company's activities in mass production of articles from the whole range of plastic materials was emphasised by the display on the Lorival stand.

The extensive industrial use of PVC, Polythene, Diakon, Polystyrene, Nylon and other thermo-plastic materials was evidenced by a group of injection mouldings.

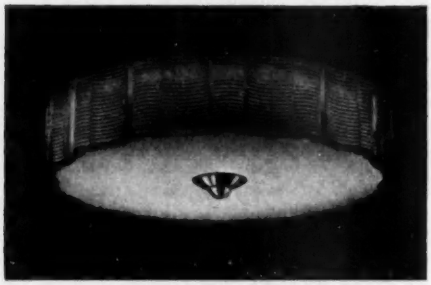
The BUYER'S *Column*

A Circular Fluoradisc

NOW available for fixing to any of the present range of "Fluoradisc" circular fluorescent lighting fittings supplied by DRUBEL DISTRIBUTORS LTD., 19-21 Stafford Rd., Croydon, is a new all plastic diffuser.

This new diffuser converts the perhaps "utilitarian" "Fluoradisc" unit into an attractive decorative fitting. It is supplied by the company at list price, £4 plus 15s. Purchase Tax.

The new Fluoradisc diffuser is most attractive



Price Changes

THE price of the Astral Refrigerator by ASTRAL EQUIPMENT LTD., 96 Buchanan St., Glasgow, C.1, as from June 3 is now 38 gns. inclusive of Purchase Tax. This is made up as follows. Retail selling price, £28 14s. 1d., plus 50% Purchase Tax, £11 3s. 11d.

Magnimeter Projection Meter

THIS new unit has been designed by BALDWIN INSTRUMENT CO LTD., Brooklands Works, Dartford, as a large scale indicating instrument for technical schools, colleges, laboratories and factories, visible from an appreciable distance.

It consists of a standard meter movement with an extended pointer which traverses a transparent scale. The pointer and scale are interposed between a light source and the lens of a film strip projector and can thus be projected on to a suitable screen.

It is made to fit most commercial film strip projectors having a slide carrier 2·1/32 in. wide by 1/4 in. thick. With projectors having a rotating slide carrier the scale can be projected either horizontally or vertically.

The basic movement has a full-scale deflection for 500 μA and by means of external series resistors and shunts a wide range of d.c. current and voltage measurement can be made. An instrument rectifier a.c. measurements can be made.

The transparent scale is interchangeable so that any desired scale values can be used, whilst the pointer can be adjusted to give zero at one end or in the centre of the scale.

An important feature is that the scale is clearly visible in bright daylight.

Flameproof Barrier Box

A FLAMEPROOF barrier box for connecting conduit entering an inflammable atmosphere from a non-inflammable atmosphere or vice versa has been developed by THE GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2.

Fitted with four 20/25 amp terminals it is suitable for use in circuits up to 660 V and has two 1 in. E.T. outlets on both incoming and outgoing sides. It has been approved by the Ministry of Fuel and Power for use in gases of Groups II and III and has been awarded Buxton Certificate FLP 3027 (Nov. 1952). Price of the barrier box is £2 18s. 4d.

New Interior Floodlight Louvres

LOUVRES for fitting inside floodlights are now being supplied by THE EDISON SWAN ELECTRIC CO., LTD., 155 Charing Cross Rd., W.C.2.

An Ediswan floodlight fitted with the new louvre

These new louvres have many advantages over the externally fitted types. These are summarised as follows:

Since the louvre is fitted close to the lamp the rings can be smaller and lighter. The louvre is protected from the weather and is therefore less prone to deterioration and corrosion. The glass of the floodlight is free of obstruction and so is easily accessible for cleaning. The internally fitted louvre is hinged for easy access to the lamp so that whilst the lamp remains easily accessible the louvre does not need to be handled and is not likely to become lost or mislaid when relamping.

The louvre shown in the enclosed photographs is constructed to suit circular floodlights whose lampholder canopy is positioned at right angles to the optical axis of the floodlight. The method of fixing consists of a split cylinder which is inserted and then expanded by means of a screw to secure a firm fit within the canopy neck.

In other types of circular or rectangular floodlights interior louvres may be secured by expanding the outer members of the louvre or by fitting outward expanding supports to grip the floodlight housing. Heat resisting colour screens, spreading glasses, etc., may be mounted in a similar manner.

TRADE PUBLICATIONS

BOILER EQUIPMENT.—Weir Feed water heaters and their applications are described in a brochure published recently by G. and J. Weir Ltd., Cathcart, Glasgow S.4.

RESISTANCES.—New brochure G.R.353 is entitled "Resistors for the Service Engineer"—Dubilier Condenser Co.(1925)Ltd., Ducon Works, Victoria Rd., North Acton, W.3.

WIRES AND CABLES.—A useful loose leaf flexible covered catalogue of the firm's range of Greenwich flexibles and cables is available from the Saxonia Electrical Wire Co. Ltd., Roan Works, Greenwich, S.E.10.

WIRING ACCESSORIES.—A new list OHL/31, available from Metway Electrical Industries Ltd., King St., Brighton 1, describes the firm's range of conduit fillings and wiring accessories.

CONDUCTORS.—New Publication 324 issued by British Insulated Callender's Cables Ltd., Norfolk House, Norfolk St., W.C.2, gives details of Overhead Conductor equipment for electric haulage in mines.

GENERATION. — The "Crossley Chronicle," organ of Crossley Brothers Ltd., Manchester 11, contains in No. 166 a description of a 100 kW steam driven Mather and Platt generator at the C.W.S. Preserve works near Reading, which has been modernised by replacing the steam engines with a Crossley Scavenge Pump diesel engine.

LAMPS AND LIGHTING.—Fifth in the series of Technical Information sheets on Osram lamps and tubes, which is published by The General Electric Co. Ltd., makes reference to the properties of the new Osram 75 W spotlight reflector lamp, the h.v. infra-red reflector lamp and the smaller bulb type of 60 W lamp.

SLATE AND ASBESTOS.—Bingley, Son and Follit, Ltd., Millbank Works, Minerva Road, London, N.W.10, have issued a leaflet dealing with the slate, asbestos and moulding materials which they are able to supply to the electrical industry.

ACCESSORIES.—The Tunion range of accessories made by George Turnock, Ltd., Navigation St., Walsall, are featured in List No. 1453 now issued.

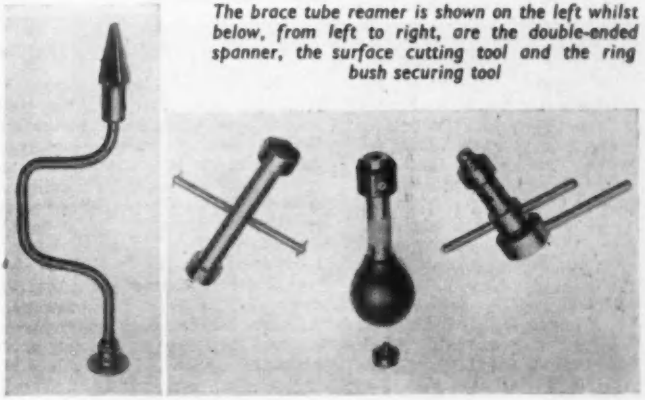
Tools for Cleaning Conduit

ALTHOUGH it is commonplace to say that efficient and permanent earth continuity is one of the most essential requirements of conduit installations, such earthing is not necessarily achieved with ease. Difficulty is often encountered during installations of conduit in cleaning contact surfaces and securing properly male and female bushes on looping and adaptable boxes.

Four tools recently marketed by the General Electric Co. have been specifically designed for the operations mentioned above. Of these, three are available either as a set or singly and comprise surface cutting tool, double-ended spanner and ring bush securing tool.

The former, designed to remove the enamel surface of conduit cores round ⅜ in. and ¾ in. holes, is of cadmium plated m.s., with a cutter of cast steel. It has a projecting spigot ⅜ in. in diameter over which a ¾ in. diameter ferrule (located in the handle) may be fitted for the larger size hole.

Designed for use in even three or four hole looping boxes, the double ended spanner, of cadmium plated steel and fitted with tommy bar, can ensure tightening of brass hexagon male bushes. The last of the set is the ring bush securing tool, fitted tommy bars and expansion grips for ⅜ in. and ¾ in. ring bushes or tube ends, and also made of cadmium plated mild steel. Finally comes the brace tube reamer, a separate tool, designed for reaming out bores of tubes and holes from ½ in. to 1½ in. diameter. This latter is being marketed at £2 9s., whilst the cost of the others, as a set, is £3 9s. 4d. and individually, £1 9s. (surface cutter), 12s. 4d. (spanner) and £1 17s. for the ring bush securing tool. At these prices, there is undoubtedly a ready market for the tools.



The brace tube reamer is shown on the left whilst below, from left to right, are the double-ended spanner, the surface cutting tool and the ring bush securing tool

The WEEK in NEWS

Electricity Expansion in Africa

O.E.E.C. Report reviews Colonial Schemes

ELECTRIC developments in colonial and other territories in central and southern Africa are proceeding apace; a new survey published by the Organisation for European Economic co-operation shows that some 1,390 MW of installed capacity should be operating in the sixteen territories concerned. (One Belgian, nine British, four French and two Portuguese). This compares with only 212 MW in 1946, and it is probable that the greatest progress will have been made in the Belgian Congo and in Northern Nigeria.

Most of the largest schemes concern the utilisation of hydro-electric resources, of which Africa, of course, possesses immense reserves. Timber is also available in great quantities, but it cannot usefully serve large concerns. Coal resources in the territories covered by the report are not very great, while they have no known oil reserves. There are limited possibilities of development of various by-products as fuel on a small scale in Angola, Mozambique, Senegal and the Congo, while in Somaliland wind power is being used to light small farms and to pump water. The hydro-electric potential if it is to be developed will require large transmission schemes to feed distant load centres.

Expenditure on Advertising Queried

THE amount of money spent by the Gas and Electricity Boards on advertising has been described as unnecessary, and as having a serious effect on business, by Saddleworth (Lancs) council. Letters expressing the view were sent to the Boards and asked the sums spent on advertising in the past year in newspapers. Replies were read at the Council's latest meeting.

As far as the Electricity Board was concerned, their reply stated that information could not be given as accounts for the year ending last March were in the course of preparation. During the previous twelve months, however, £42,855 was spent on all forms of publicity. The Gas Board stated that, as directed, they had not conducted any promotional Press or post advertising for the past two years. During that time sales of gas appliances had remained almost stationary

Clr. A. S. Green, who initiated the complaint, agreed it was common sense to advertise, but called attention to the £87,040 spent by the N.W. Gas Board, which, he said, was £66,000 more than in the whole of Scotland and £49,000 more than in Wales.

DISPOSAL OF ZINC STOCKS

WHEN arrangements for zinc stock disposal ends next month, stocks remaining for sale will be limited to about 70,000 tons. The Ministry of Materials made this announcement last weekend following reports that the Ministry had large stocks of zinc for disposal. It is proposed to sell this amount gradually and the Dept. is satisfied that the effect on supply and demand will be insignificant. Discussions with the trade are to take place and a further announcement will be made later. The Ministry will continue to sell zinc bought from current production under public trading contracts.

Tungsten Ores

AN announcement was made last week by the Ministry of Materials concerning a reduction in the selling prices of tungsten ores of standard 65% grade and ordinary quality. As from June 9, Wolframite has gone down by 17s. 6d. to 335s. per long ton unit delivered consumers' works, and Scheelite from 342s. 6d. to 325s.

The First Half-Century

When Professor Fleming was receiving messages at the Royal Institution simultaneously from University College and from Poldhu, via Chelmsford, Mr. Maskelyne and Dr. Horace Manders interpolated other messages. The Professor naturally thinks that the Royal Institution should be sacred from such interference, and calls it a deliberate attempt to wreck his demonstration. Mr. Maskelyne replies that he refrained from wrecking it, though he might have done so had he chosen, and that were Mr. Marconi's claims to security valid, Professor Fleming would never have known of the attempt. No doubt it is true that Mr. Marconi some time ago challenged Sir William Preece and Sir Oliver Lodge either to intercept or interrupt his messages, but Professor Fleming cannot be held responsible for that challenge, and he certainly never made any pretension to immunity.—*From our issue of June* 18, 1903.

Decentralisation Plan to be considered by Ministers

SOME time ago we noted in these columns that the National Municipal Electricity Consumers' Association was drawing up proposals for the decentralisation of the electricity supply industry and were to submit those suggestions to the Conservative Party's Parliamentary Fuel and Power Committee. This has been done, and a reply has been received from the Committee to the effect that the views would be considered by the appropriate Ministers in due course.

In the main, the Association's suggestions cover the decentralisation of the B.E.A., local control of distribution and the reduction of administrative costs. Mr. A. J. C. de Renzi, former borough electrical engineer at Newcastle-under-Lyme is hon. secretary of the Association. In place of the Central Authority there would be a Central Electricity Board and an Electricity Commission. The 14 Boards would also be disbanded and be replaced by a large number of Joint Electricity Boards, comprising members of local councils in the area. The new organisation is claimed to save two tiers of administration, namely Area Board and Sub-Area headquarters.

Illumination of the Golden Coach

HAD it not been for special lighting arrangements in the Golden State Coach, H.M. the Queen would have been seen by far fewer people along the processional route on Coronation day. As it was, five 15 in. fluorescent tubes fitted inside the coach pierced the wet and overcast weather outside. All the lamps were housed in Perspex fittings. Two were mounted on the sides of the coach at the juncture of the roof and side panels, and three in a similar position above the front glass panel. Current was supplied by a 24V battery under the front seat. Joseph Lucas Ltd. and C.A.V. Ltd. were honoured by Royal Command to do the work through Hooper and Co. (Coachbuilders), Ltd.

Apart from the State Coach, the Irish Coach, Glass Coach and Queen Alexandra Coach were similarly equipped for the occasion. State Landaus and Clarence Carriages were also illuminated.

London's Floral Decorations

AT the time of our preview, last December, of the various decorative features prepared for the Coronation, it was obvious that great use was to be made of the "Chrysaline" materials. When the decorations were eventually put up, that observation proved perfectly correct, but another substance proved equally popular, namely fluorescent plastic sheet which appeared in quantity especially as floral decorations. Their use in Piccadilly, St. James's St., Regent St., Kensington and Festival Gardens, and in window displays, offices, and hotels paid tribute to the effectiveness of that type of decoration. The material chosen for most of the decorations was fluorescent 'Cinemoid,' the non-inflammable 'Celanese' Acetate sheet which has been put to excellent use in cinema and theatre for colour lighting effects. The newer fluorescent 'Cinemoid' gives added brilliance to floral decorations.

ALLEGATIONS OF CONTRACT "RING"

AT a meeting of Belfast city council earlier this month it was alleged that manufacturers had created a "ring" which was placing the tender system in jeopardy. The protest arose over an Electricity Committee minute proposing to accept tenders of £1,470,593 for turbo-alternators and £2,976,496 for boilers. The committee asked permission to take the minute back for further consideration, whereupon Councillor J. Macgougan asserted that in the case of the turbo-alternators there were eight tenders all at the same price. He said it was clear that the manufacturers had decided among themselves the price, dates of delivery and completion, and who should do the work. It was not within the Council's ability to break this and other "rings" but they could bring the matter to the Government's attention.

Before the war Australia was forced to import all her supplies of electrical steel, used for making laminated steel cores for dynamos, motors and transformers. Now, however, she is able to produce most of her requirements of high grade, hot-rolled silicon steel sheets. John Lysaght (Australia) Pty. Ltd. began making small quantities of the steel during the war and have continued. Photograph shows workmen stacking the steel sheets. Annealing furnaces in the background are electrically fired

MOBILE DISPLAY BEGINS 4th SEASON

DESPITE the many accusations of slow progress in spreading electricity supplies to rural areas, an ever increasing number of farms, hamlets and villages are being connected, and among those trying to keep pace with development are the salesmen of Hoover, Ltd. Aided by the company's mobile exhibition, which has become a familiar sight at many agricultural shows, they appear to be doing a good job. The exhibition is now beginning its fourth summer touring season. Entirely self-contained, it comprises two large trailer caravans usually placed at right angles to one another and enclosing, by means of poles and ropes, a display area of 1,500 sq ft. It provides its own power points, hot water supply, office and other services. As far as exhibits are concerned there is the fractional h.p. motor which can be used to drive most farm equipment and wide range of agricultural and domestic appliances. We note that the mobile exhibition has already won a number of awards as the best display at various shows.

OFFICIAL PUBLICATIONS

ENERGY IN OVERSEAS TERRITORIES —South and Central Africa. Published by O.E.E.C. (see page 1162).

N. OF SCOTLAND H.E. BOARD. Constructional scheme No. 23A, Moriston project. Confirmation order, 2d.; and explanatory memorandum, 3d. From H.M.S.O. (see page 1167).

DEFENCE SPECIFICATIONS. Def. 9: Polyvinyl Chloride Insulating and Sheathing Compounds for Electrical Cables. H.M.S.O. 3s.

MIN. OF EDUCATION, Rules 127. Award of Nat. Certs. and Diplomas in Electrical Engineering to Students in Establishments for Further Education in England and Wales. H.M.S.O. 4d.

No Load Spreading Next Winter

AT the June meeting of the Southern Regional Board for Industry, the chairman stated that next winter there would be no load spreading for industry. At the same time, he said, general economy during peak hours would still be necessary and warnings to that effect would be publicised before winter began. Peak hour reductions might be needed in the event of extreme weather conditions, the chairman added.

HEAT CONTROL DEVICES

— Committee Formed

IT was announced last weekend that a new Heat Control Devices Committee has been set up, comprising bona-fide British manufacturers of thermostats, switches, energy regulators for cooking equipment and water heating. At present it is an independent committee, but will work in close liaison with B.E.A.M.A. and other kindred bodies. Chairman is Mr. R. W. Towers of the Rheostatic Co., and secretary is Mr. S. H. Naylor, Kingsway House, Kingsway, W.C.2.

Apart from the two companies already mentioned present members are understood to be Arrow Electric Switches Ltd., S. Davall and Sons Ltd., Robert Maclaren and Co. Ltd., Process Control Gear Ltd., Salford Electrical Instruments Ltd., Sunvic Controls Ltd. and Turnright Controls Ltd.

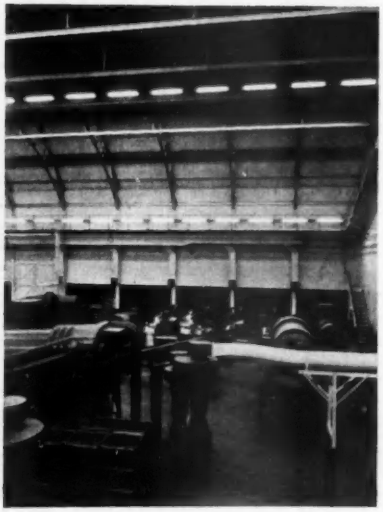
Model Engineers' Exhibits in August

ARRANGEMENTS are well in hand for yet another model Engineers Exhibition. This year it is to take place between August 19 and 29 at the New Royal Horticultural Hall, Westminster.

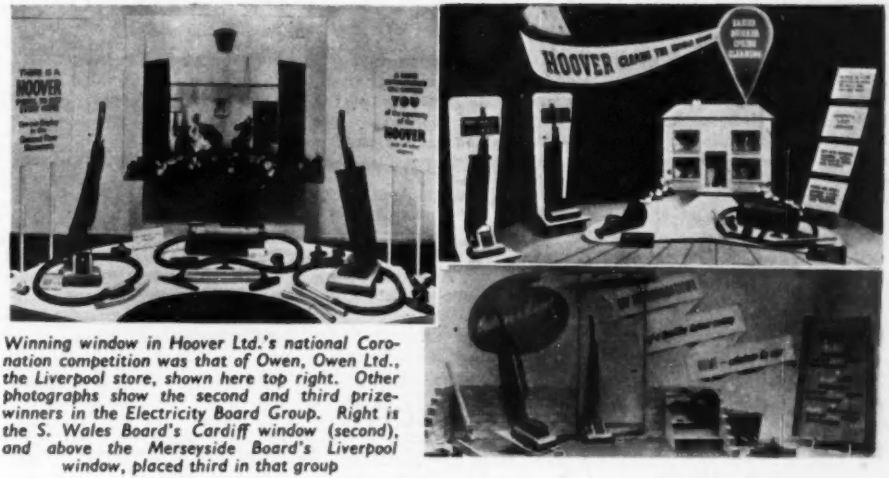
Tobacco Factory was once a Film Studio

AN unusual lighting installation has been carried at the new factory of Ardath Tobacco Co., at Welwyn Garden City. The building was formerly a film studio and with its height of some 58 ft. presented a problem to the illuminating engineers of Thorn Electrical Industries, Ltd., who undertook the task. There existed in the building, overhead walkways and these were employed to hold parabolic angled fittings mounted on cable trunking with control boxes similarly fixed. Colour scheme is white and green—all machinery is painted the latter colour—and there is a buff-coloured tiled floor. To blend with this a combination of Daylight and Northlight tubes were mixed in equal proportion.

This may well be one of the first instances of the exclusive use of angled type fittings for such a high building, but the overall effect of shadow-free illumination has undoubtedly proved satisfactory and earned the praise of employers and employees alike. Scheme was carried out by Electrical Installations, Ltd.



A corner of Ardath's new factory showing fittings mounted on the walkways. Some idea of the building's height may be gained by comparing the persons working at one of the machines



Winning window in Hoover Ltd.'s national Coronation competition was that of Owen, Owen Ltd., the Liverpool store, shown here top right. Other photographs show the second and third prize-winners in the Electricity Board Group. Right is the S. Wales Board's Cardiff window (second), and above the Merseyside Board's Liverpool window, placed third in that group

Hoover's National Display Competition

RESULTS of the national window display competition organised by Hoover Ltd., coincidentally with the Coronation festivities, were announced last week. The national prize winner, awarded the special challenge cup and cash prize of 100 guineas, was Owen, Owen Ltd., of Liverpool, who gained first place in the section devoted to departmental stores and home furnishers. Other winners in this section were the Dublin firm of Pine Bros., Ltd., and R. W. Weekes, of Tunbridge Wells.

Electricity Boards had a section of their own, and winners of the 50 guineas first prize were the Merseyside and N. Wales Board at Prescot, Lancs. Second prize of 25 guineas went to the S. Wales Board's Rumney, Cardiff, service centre, while the third award of 15 guineas was gained by the Merseyside Board again, this time by their Whitechapel, Liverpool, showroom. The third section concerned electrical contractors and ironmongers and awards went to Willmott's Store Ltd., Norwich, Dean and Noble Ltd., Hyde, Cheshire, and J. Holdean of Ashby-de-la-Zouch, in that order.

Prizes of ten guineas were also awarded to the best displays in each section in the company's ten branches throughout England. Board winners of these awards were the S.E. Board, Hastings, the London Board's Camden Rd., N.W.1 showroom, the Eastern Board's Ipswich centre, the E. Midlands Board's Northampton shop, and the Midlands Board's Gloucester showrooms.

New Appliances at Highland Show

TWO new agricultural appliances will be exhibited for the first time at the electricity stand at the Royal Highland Show which opens at Alloa next Tuesday. The stand has been organised by the E.D.A. and S.E. Scotland Electricity Board. The new equipment comprises an automatic poultry feeder which has a motor-driven conveyor, and an electric pressure cooker for hastening the preparation of animal feed. The display, which will be centred round a Coronation motif, emphasises the assistance which electricity gives to the farmer, and will show a wide variety of electrical farming apparatus. In addition, there is to be a domestic section including cookers, water heaters, refrigerators and similar appliances. The show closes on June 26.

LABOUR'S POLICY ON ELECTRICAL INDUSTRY

POLICY statement issued yesterday by the Labour party contains a reference to the heavy electrical engineering industry. The statement, entitled "Challenge to Britain," promises that the capacity and policies of the industry will be reviewed after publication of the Report of the Monopolies Commission.

The statement also refers to the fact that increased investment at home and abroad depends to a large extent on the capital equipment side of the industry, and it was not certain that the necessary expansion would take place. The Monopolies Commission was dealing with manufactures of generators, transformers and motors, and it remained to be seen whether private ownership conformed to the country's interests.

Facts for Farmer

IN connection with the article "It is time that the Farmer knew the Facts," which appeared in last week's issue, we wish to acknowledge the considerable help given us by the staff of the South Western Electricity Board, and especially by Mr. W. J. Guscott, in obtaining the information on which the article was based.

NEWS IN BRIEF

A notable meeting took place in Edinburgh recently between the E.C.A. of Scotland and the Board of the National Register of Electrical Installation Contractors. It was said to be of mutual benefit.

First of 573 diesel-electric shunting locomotives are now being produced at the British Railways workshops at Derby.

Archibald Low & Son, Ltd., last week staged a cruise on the Firth of Clyde, which some 700 employees and guests enjoyed, to mark the centenary of the firm. The company was founded in 1853 as a plumbing and heating business.

David Brown and Sons (Huddersfield), Ltd., have secured a £15,000 order from the Aluminium Co., of Canada, Ltd., in face of keen American competition. It involves the supply of 350 "Coventry" geared motors.

Last week-end Ferranti Foremen's Association held their ninth annual meeting at the company's Edinburgh works.

Some 900 employees and friends of London Electric Wire Co. and Smiths Ltd. attended the Company's Coronation dance on June 5.

Erskine Heap and Co.'s Amateur Dramatic Society produced "Here We Come Gathering" recently.

Questions in Parliament . . .

Rural Electrification

On Friday last Mr. G. Nabarro initiated an adjournment debate on the progress of rural electrification. He was somewhat restricted in his remarks because a motion on a similar subject which has proceedural precedence, is due to be discussed tomorrow. However, he successfully made the point that at the end of March only 41.4% of British farms were connected to the public supply in the B.E.A. area, and that this compared unfavourably with the U.S.A. (84%) and France (86%). He also alleged that only about 3% of the total B.E.A. investment in recent years has been devoted to rural electrification. Finally, he dealt with a particular case, the village of Stoke Bliss, for which a scheme was abandoned because the necessary guarantee (£1,131 per year for 43 consumers) could not be obtained by the Midlands Electricity Board.

Mr. H. Davies, who followed, had a word of praise for the Midlands E.B., and he had found its chairman always willing to consider sympathetically any appeal put forward by a Member of Parliament. Mr. Davies thought that special attention was necessary to the question of electricity and water supply.

In his reply, Mr. L. W. Joynson-Hicks, Parliamentary Secretary to the Minister of Fuel and Power, suggested that there was nothing to prevent Mr. Nabarro starting his own local power-producing plant in Stoke Bliss to provide the village with electricity. As regards general policy on "marginal cases of economic rural development," he postponed his answer until tomorrow. With reference to comparisons with overseas figures, he suggested that much depended on the definition of a farm. Moreover, the high rate of electrification in France, for instance, was because much electrification there is for light only, a large proportion is carried out on the low tension system, and "the supply is not of a sort of quality which would be envisaged in this country." Finally, he suggested that the figure of 3% for investment in rural electrification was completely misleading.

Debate on Purchase Tax

The Finance Bill was debated in the Committee stage during last week and on Wednesday there were numerous comments on purchase tax. Although most of the debate centred round taxes on textiles there were some remarks on products of the electrical industry. Probably the strongest comments in this connection came from Mr. A. Crosland, who took the unusual line of saying that purchase tax had its advantages. It could, he said, be an effective weapon for increasing exports. He instanced among other items, refrigerators, washing machines and similar domestic electrical equipment, which, he said, had not been able to satisfy the whole of the export demand and the entire home market. It was of assistance to the export trade that home sales had been discouraged.

Referring to the tax on electric fires, Mr. Crosland said they were acclaimed as being the most wasteful method of space-heating, and yet there had been a reduction in tax.

Among other speakers was Sqdn. Ldr. A. E. Cooper, who mentioned a company in his constituency making radio and TV sets which had been severely hit by the excessive tax. It was an essential defence industry, he said, and could not afford such handicaps. Mr. R. Maudling spoke on the question of essentials and non-essentials for the imposition of tax. It was difficult to choose between heating appliances, radio and TV sets, and similar items, and say one was a necessity and the other not.

In his final comments, Mr. R. A. Butler said he had been asked if he intended to abolish purchase tax altogether. That, he said, would be very difficult because of the large revenue—at present about £300 million—derived from it.

Electric Supply News . . .

Carrington

The first 60 MW hydro-cooled generator at the Carrington power station, North Western Division, B.E.A., is expected to be in operation in August, we understand.

Eire

Figures showing the cost of power generation from turf up to March 31 last, as compared with other fuels used by the Electric Supply Board at its power stations, were given by Mr. Lemass, Minister for Industry and Commerce in the Dail last week. At the Pigeon House station, Dublin (coal fired) the average cost per amount generated was 0·96d., at North Wall (oil-fired) 0·79d., Portarlington (turf-fired) 0·76d. and at Allenwood (turf-fired) 0·81d., he said. The Minister added that since the end of March, the price of coal and oil had been reduced, as had the price of turf at Portarlington, but for Allenwood there was an increase. So far as could be seen the comparative figures were Pigeon House, 0·82d.; North Wall, 0·64d.; Portarlington, 0·64d. and Allenwood, 0·84d. The reason for the difference between Portarlington and Allenwood was that the development costs at the latter station were higher, he said. The figures showed that the use of turf did not make electricity dearer, he added.

Fort William

The Town Council is to seek advice in regard to its claim that the North of Scotland Hydro-Electric Board should be empowered to grant electricity supplies at rates sufficiently low to attract industries to the Highlands. Councillor J. McPherson said that when Parliamentary sanction was being sought to utilise the water power of the Highlands the "carrot" of cheap electricity and new life for the Highlands was dangled in front of them, but apparently the carrot was now no longer necessary. He maintained that in the same way as industries in the region of coalfields got cheap steam power, so industries in the Highlands should have cheap electrical power. Councillor A. White declared there was no hope of attracting industry to the Highlands unless current could be supplied at a low rate.

N. Ireland

The scheme for the construction of a dam and a hydro-electric generating station on the River Dann, at Carnroe, near Kilrea, has now been approved by the Northern Ireland Ministry of Commerce.

North of Scotland

An amendment to the Moriston project of the North of Scotland Hydro-Electric Board has been approved by the Secretary of State for Scotland. The amendment will not affect the annual output of the scheme, which is estimated at 213 million units. Under the original scheme it was proposed to develop the power in the lower River Moriston in two stages. The upper stage envisaged a small reservoir, a short aqueduct and a generating station at Dundreggan, and the lower stage a larger reservoir formed by a dam near Livishie, a tunnel two miles long and a power station at Invermoriston. Under the amending scheme the power will be developed in one stage by taking the water direct from the reservoir at Dundreggan to an underground power station nearby, which will discharge into a tunnel leading to Invermoriston. A subsidiary station which was to have been built near the Livishie dam will, under the new scheme be built near the Dundreggan dam. Estimated cost of the whole scheme, as amended is £13 million.

Stratford-upon-Avon

The city was last week the scene of another public enquiry into an application by the Midlands Electricity Board to erect overhead lines—this time in an attractive part of Alveston. Mr. G. P. Wilson, solicitor to the Board, said the length of o.h. lines proposed totalled 1,702 yards. The Board had paid careful attention to the siting of the poles so that every advantage would be taken of natural features to make the cables as inconspicuous as possible. The estimated cost of o.h. cables as proposed was nearly £2,000 and the cost of underground cables would be almost double. All the owners and occupiers of land over which the proposed lines were to run had given consent to the placing of the lines. Stratford's Town Clerk, Mr. T. E. Lowth, said that the Council had a genuine and emphatic desire to preserve the natural amenities of the neighbourhood. Until a short time ago no overhead cables or pylons had been erected within the borough with the consent of the council. But as the result of recent similar enquiries, two further cases of o.h. cables had been put up with permission of the Ministry of Fuel and Power. It became apparent therefore, Mr. Lowth said, that as the provision of o.h. cables increased it was incumbent upon the council to become more vigilant.

LIGHTING SCHEMES

Bideford.—The T.C.'s scheme for trunk road lighting has been rejected by the M.O.T.

Bridgwater.—The R.D.C. understands that the M.O.T. is recommending loan sanctions for electric street lighting schemes at North Petherton and Wembdon.

Brightlingsea.—The U.D.C. have approved in principle a draft scheme for electric street lighting, to cost approximately £3,000.

Company Activities . . .

Ada (Halifax) Ltd.

This company's machine tool and electric washing machine businesses seem to be balancing things very well. Last year it was the latter which suffered severe recession, while production of machine tools improved considerably.

Year to Mar 31	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1951	235,929	88,795	42	10	1/6	1/-
1952	197,812	62,713	30	15	1/3	11d.
*1953	99,853	23,811	11	13¾	1/3	11d.

* For eleven months only.

But for the first three months of 1953, Mr W. D. Gibbs, chairman, reports that the new lower priced washing machine met with remarkable success in the home market, while at the same time there has been a general falling off in the demand for machine tools. In addition the company makes components for aircraft manufacturers.

British Thermostat Co. Ltd.

The decline in certain spheres was offset by increased business in new automatic controls for other fields, while the divisionalisation of activities contributed towards the successful results for the year just ended, according to Colonel N. Hudson, the chairman. The venture into distributing direct to the refrigerator trade

Year to Jan. 31	£ Profit Trading	£ Net Profit*	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1951	366,430	130,397	162	30	36/–	29/–
1952	373,581	116,953	145	30	29/3	24/–
1953	346,576	148,337	178	35	33/3	28/–

* Available for parent company.

met with some success. The French subsidiary recorded a reasonable profit, and it is the intention of the directors to extend the overseas business by establishing service and selling organisations abroad. At the meeting on June 27, shareholders will consider proposals for the capitalisation of part of the reserves to be distributed as a bonus to Ordinary shareholders on a one-for-one basis. The Capital Issues Committee has consented to the proposal.

Garrard Engineering and Manfg. Co.

The net profit for the year ended January 31 last, at £52,377 is £3,934 down on the corresponding total for the previous year. With a final dividend of 11% the Ordinary distribution again totals 21% for the year.

Heatrae Ltd.

Bearing in mind that the reduction in the net profit for the year ended February 28 last, compared with the previous year, was due entirely to the falling off of orders for electric water heaters brought about by the heavy purchase tax, Mr. C. H. Smith, chairman of this company is much more optimistic of the future in view of the partial relief granted in the Budget. He reports that a substantial volume of orders are in hand, many

Year to Feb. 28	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	33,903	11,637	39	12½	5/1	3/9
1950	8,084	— 246*	—	12½	4/-	3/9
1951	24,903	9,415	33	12½	3/10	3/-
1952	46,022	14,665	53	12½	4/-	3/4
1953	38,400	11,464	39	12½	3/6	3/4

* Loss

being Government contracts, particularly for the Admiralty, for hot cupboards, water heaters and immersion heaters. The financial position of the company is strong. Current assets total £126,451, of which stocks in hand account for £84,724 as against £80,879 a year before.

George Kent Ltd.

A proposal to increase the authorised Ordinary capital from £400,000 to £550,000 is to be considered at a meeting on June 30.

Laurence, Scott and Electromotors

The "A" and "B" Ordinary shareholders are being offered 160,400 "A" Ordinary 5/- shares at par in the proportion of one for every ten held.

Lisbon Electric Tramways Ltd.

Receipts, etc., for 1952 at £2,888,512 are £183,732 higher than for the previous year. The dividend is again 5%, tax free.

Mexican Light and Power Co.

Although the earnings improved from $25,248,738 in 1951 to $26,307,371 (Canadian currency) for 1952, the directors consider the latter as not a satisfactory return. The company suffers at present from a serious cash shortage due to the demands of its construction programme, the board points out. Further substantial funds are required, particularly pesos, not only to complete the present main construction programme in Mexico, but also to carry out essential and continuing heavy expenditures for new distribution work. To place the company on a more sound operating basis, in order to be in a position to borrow further funds, the directors have applied for an increase in the rate of return.

Oriental Telephone and Electric Co., Ltd.

The group profit for 1952, after allowing all charges including taxation, is £113,610 as against £106,839 for the previous year. The final dividend of 12% again makes a total of 16% for the year.

Power Investment Corpn.

For the year to March 31 last, the revenue amounted to £67,267—some £2,600 lower than for the previous year. The dividend is 2% (*nil*).

Power Securities Corpn. Ltd.

The reduction in the gross profit is due to the 1951 figure having been enlarged by final adjustments in respect of certain completed contracts, Sir Andrew MacTaggart, the chairman, points out. The consolidated current assets, at £6,226,800, are £2,141,892 higher than the previous year because of the larger volume of construction work on hand. The two principal electrical

Year to Dec.31	£ Trading Profit	£ Net Profit *	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	378,641	123,027	22	6	30/6	26/4
1949	410,513	109,992	19	6	28/9	24/6
1950	440,166	135,975	26	6	26/9	22/-
1951	535,336	134,835	26	6	28/9	25/3
1952	438,333	130,842	24	7	25/6	19/6

* Attributable to parent company.

contracts on hand in the U.K. are the construction of the Staythorpe and Carmarthen Bay power stations for the B.E.A., on both of which progress is good. Overseas, detailed design work has started for the Seven Forks hydro-electric project south of Nairobi, and an extension at Pangani Falls power station, Tanganyika, will come into commission this year. Apart from the Mau Mau troubles, the future for East Africa looks good, he adds.

R. B. Pullin and Co. Ltd.

At last week's extraordinary meeting, resolutions were approved increasing the capital to £300,000 by the creation of 75,000 7½% Cumulative Redeemable Preference shares of £1 and 1,250,000 shares of 2s. each which, with the existing one million shares of 2s. are now to be designated "Ordinary shares."

River Plate Electricity and Other Securities Corp.

The net revenue for the year ended April 15 last, at £41,698 is £652 higher than for the previous year, but Sir Bernhard Binder, the chairman, warns that there are indications that industrial profits are showing a declining trend. The Ordinary dividend is again 10%.

Wm. Sanders and Co. (Wednesbury)

Competition is tending to become more severe in the switchgear trade in which this firm is a well-known manufacturer. That may be the reason for the slight reduction in the trading profit of this company. The balance sheet,

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1950	50,545	19,036	46	*40	—	—
1951	40,848	12,329	31	25	3/5	2/6
1952	36,298	11,677	28	20	3/3	2/6

* Tax free and Plus 200% capital bonus.

however, shows a healthy state of affairs. Of current assets, stocks and work in progress at December 31 last are listed at £97,052, an increase of about £2,500, but trade debtors is approximately £4,000 up at £43,405.

J. Stone and Co. (Holdings) Ltd.

For the year ended December 31 last, the consolidated net profit amounts to £495,108—nearly £100,000 more than for the previous year. The dividend for the year has also been raised to 18%, with a final of 13%—as was forecast in March when 171,543 "A" Ordinary £1 shares were offered at 50/- each. The group profit figure is struck after charging taxation of £785,459 (*£718,045*), according to the preliminary statement.

Telephone Manufacturing Co.

The group net profit for 1952, after allowing all charges, including taxation, amounts to £57,327 compared with £111,405 for the previous year.

Transformers (Watford), Ltd.

Production last year was a record in the history of this company, Mr. A. T. Worboys, chairman of the London Brick Co., the proprietors of the firm, stated at the annual meeting recently. Rearrangements have been carried out at the works under the direction of Mr. G. B. Proctor, the managing director, which should increase efficiency and enable a larger output to be secured. Further additions and alterations with the same end in view are under consideration at the present time, he added.

Venner Ltd.

The continuous expansion in recent years of this old-established company is clearly reflected in our table of results for the past five years. The output for 1952 was a record, states Mr. A. A. Rowse, the

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	1,606	-28,729*	—	—	9/9	5/3
1949	54,878	11,310	8	5	7/6	3/3
1950	79,499	24,043	20	12½	9/3	4/6
1951	105,621	33,305	22	15	10/3	7/-
1952	110,344	22,702	17	15	8/6	5/6

* Loss.

chairman, but higher taxation has reduced the net profit a little. The demand for time switches has been well maintained. The accumulator subsidiary has made a small contribution to the profit, and the electronic concern has made good headway, he reports.

B. S. & W. Whiteley

The volume of production during the year ended March 31 last was again increased, and there are hopes that output will be raised considerably during the present year, Mr. William Whiteley, the chairman, reports. The overseas market for the firm's products is capable of development, apart from expansion in indirect exports.

Dividends Declared

Holophane Ltd.—Interim of 7½% (*same*).

W. H. Allen, Sons and Co.—Final dividend of 10% making a total of 15% for 1952. Profit, before tax, is £647,965 (£638,515).

Commercial Information

CONTRACTS OPEN

HOME

June 19.—Belfast. Supply, erection, etc., of 110 kV and 33 kV main cables, auxiliary cables, etc., for Municipal power station to Donegall substation (N.1235), and 33 kV main cables and accessories for Stage 2 of 33 kV distribution system (N.1236). Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See May 7 issue.)

June 20.—Limerick. Electrical installations in additions, etc., at Mental Hospital. Consulting engineer, Nicholas Mathews, 42 Fitzwilliam Place, Dublin. Deposit £10 10s.

June 22—Luton T.C. Electrical installation of St. Matthew's C.P.J. school. Borough Engineer, Town Hall. Deposit £2 2s.

June 23.—Altrincham T.C. Installation of street lighting along Stockport Rd., involving supply and installation of 40 concrete columns, lanterns, 400 W mercury lamps and sets of auxiliary equipment. Borough Surveyor, Town Hall. Deposit £2 2s.

June 24.—Bedfordshire. Installation of electric light in first stage of erection of secondary school at Arlesey. Applications by above date to County Architect, Shire Hall, Bedford.

June 24.—Carlisle. Cumberland River Board invites tenders for installation of additional lighting at Board's London Rd. headquarters. Details from Board's Chief Engineer.

June 24.—Windsor T.C. Electrical installation in 50 houses on Manor Farm site. Borough Engineer, Kipling Memorial Building.

June 26.—Liverpool. Electric light and power wiring in male wards of Chest Hospital. Garnet Chaplin, secretary to S. Liverpool Hospital Management Committe, Sefton General Hospital.

June 26.—Tayport (Fife) T.C. Electrical work in erection of 28 houses on Cupar Rd. site. James Gentles and Son, quantity surveyors, Central Chambers, Kirkcaldy.

June 27.—Leven T.C. Installation of 140 W sodium discharge street lighting along trunk road A.915 for about one mile. Burgh Surveyor, Carberry Hse.

June 27. — Thornaby-on-Tees T.C. Installation of electricity in 346 houses and shops at present served by gas. P. Brown, Borough Engineer, Town Hall. Deposit £2 2s.

June 27.—Worksop R.D.C. Supply, erection, etc., of submersible pump and electric motor at waterworks at Blyth. Council Offices, Highfield Hse., 222 Carlton Rd. Deposit £2.

June 29.—Co. Tyrone. Electrical installation in two new schools at Drumquin and Castletown. Munce and Kennedy, Chart. Archs., 133 University St., Belfast. Deposit £3 3s.

June 29.—Failsworth U.D.C. Supply and erection of 80 street-lighting columns in group A, with sodium lamps, lanterns and all auxiliary equipment. Engineer and Surveyor, Town Hall. Deposit £2 2s.

June 29.—Litherland U.D.C. Supply and installation of lanterns, sodium lamps, control gear and concrete columns in class A, along Bridge Rd. Engineer and Surveyor, Town Hall, Liverpool 21. Deposit £1 1s. (See June 11 issue.)

June 29.—Manchester. Electrical installation (phase 2) at Queens Rd. 'bus garage. City Architect, Town Hall. Deposit £1 1s. (See June 4 issue.)

June 29.—Northern Ireland. Electrical installation at Faculty of Agriculture Building, Queen's University, Elmwood Ave., Belfast. Documents from Ministry of Finance (Room 103), Law Courts Building, May St., Belfast.

June 30.—Ashbourne U.D.C. Supply and erection of 114 150 W tungsten lamps and standards for stage 2 of public lighting scheme. Engineer and Surveyor, King Edward St. Deposit £1 1s. (See May 28 issue.)

June 30.—Dagenham T.C. Supply and erection of 42 group A lighting units along London-Tilbury trunk road. Borough Engineer and Surveyor, Civic Centre.

June 30.—Grimsby T.C. Electrical installation in erection of Western primary junior school at Broadway, Littlecoates. J. V. Oldfield, Borough Engineer and Surveyor, Municipal Offices, Town Hall Sq. Deposit £5.

June 30.—Londonderry. Electrical installation for new X-ray dept. at Waterside Hospital for N.I. Hospitals Authority. W. and M. Given, architects and engineers, 1 Waterside, Coleraine. Deposit £2 2s.

June 30.—Manchester T.C. Electrical installation in 46 police houses on 13 sites. Director of Housing, Town Hall.

July 2.—Alnwick U.D.C. Supply and erection of 41 street lamps along trunk road. Surveyor, Council House, Wagonway Rd.

July 3.—Gipping (Suffolk) R.D.C. Wiring of 134 houses in various parishes. Engineer and Surveyor, Council Offices, Needham Market, nr. Ipswich.

July 4.—Glendale (Northumb.) R.D.C. Internal electric wiring in 16 houses in Langton Ave., Lowick. Surveyor, Council Offices, Wooler. Deposit £2 2s.

July 4.—St. Neots U.D.C. Supply and erection of 15 concrete columns and lanterns with 100 W tungsten filament lamps, wiring, etc. Surveyor, Council Offices, Huntingdon St.

July 6. — Bentley-with-Arksey U.D.C. Supply of lanterns, lamps and control gear, provision of underground cable, and supply and erection of columns and fitting and wiring of equipment for sodium lighting along two miles of Gt. North Rd. Engineer and Surveyor, Council Offices, Cooke St. Deposit £2 2s. (See June 11 issue.)

July 6.—West Riding. Renewal of electrical installation at Ecclesfield grammar school. County Architect, Bishopsgate, Westfield Rd., Wakefield. Deposit £2 2s.

July 7.—Fife. Electrical work in erection of new high school at Buckhaven. Frank W. Raynes and Son, Consulting Engineers, 40 Second Ave., Cathcart, Glasgow.

July 11.—Longbenton U.D.C. Electrical installation in 180 houses at Burradon. A. E. Sweetman, surveyor, Council

Offices, Forest Hall, Newcastle-on-Tyne. Deposit £2 2s.

July 11.—Southport T.C. Installation of electric lighting and heating in 8 shops and 8 maisonnettes on Heathfield Rd. estate. Borough Architect, 93-105 Lord St. Deposit £1 1s.

July 13.—Bromley (Kent) T.C. Group A street lighting improvement scheme in four roads, involving re-erecting of existing columns and fixing 38 140 W sodium lanterns. Borough engineer, Municipal Offices, Bromley, Kent. Deposit £2 2s. (See June 11 issue.)

July 13.—Wallasey T.C. Electrical installation at Leasowe secondary and the Birket primary schools. Borough Architect, Town Hall. Deposit £1 1s. (Advertised in this issue.)

July 13.—West Riding. Improvement to existing electrical installation at Todmorden Roomfield secondary school. Also renewal of electrical installation at Thorne Moorends boys' primary school and part renewal of same at Thorne Moorends girls' secondary school. These are separate contracts. County Architect, Bishopsgate, Westfield Rd., Wakefield. Deposit for second contract, £2 2s.

July 17.—Manchester. N.W. Div. of B.E.A. invite tenders for repairs to hyperbolic cooling towers at Stuart St. power station. Divisional Secretary, 825 Wilmslow Rd., Manchester 20. Deposit £2 2s.

July 21.—Waterford. Supply and erection of pumps and electric motors suitable for 380 V, 3-phase a.c. supply for Tramore water supply scheme. Engineer, Council's Offices, Davitt's Quay, Dungarvan. Deposit £1 1s.

No date stated.—Peterborough. Nene River Board invites tenders for construction of small electrically operated pumping station near Dog-in-a-Doublet Sluices. Apply to Board's Engineer, North St., Oundle. Deposit £3 3s.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horse Guards Avenue, S.W.1, quoting reference.*

July 9.—Formosa. Central Trust of China requires various quantities of electrical equipment, underground cables, insulated wire, etc. Trust is at 96 Po Ai Rd., Taipai, Taiwan. B.o.T. (Ref: CRE 19078/53).*

Aug. 4.—India. Supply and erection under Spec. No. E-203, of outdoor and indoor switchgear equipment for substation covered by Salem-Namakhal 110 kV extensions, for Madras Electricity Dept. Tenders to Superintending Engineer, Technical (Electrical), 157 Mount Rd., Madras 2. B.o.T. (Ref: CRE 19705/53).*

Aug. 25.—Brazil. Mechanical and electrical equipment for Ernestina Hydro-Electric power station includes hydraulic turbine unit, overhead crane, three-phase alternator, switchboard and transformer equipment, and power station ancillary equipment. Tenders invited by Rio Grande do Sul State Electric Energy Commission, Passo Fundo, Brazil. B.o.T. (Ref: CRE 19264/53).*

July 10.—Uruguay. Usinas Electricas y los Telefonos del Estado requires supply of material, including busbars, insulators, disconnecting blades, automatic interruptors, relays, etc., for transformer stations of 30/6 kV 50 c/s. Tender No. 3867/53. Spec. 2187. B.o.T. (Ref.: CRE 18575/53).*

July 15.—Formosa. Supply of a motor-generator set, direct coupled, d.c., 10 V, 1,000 A with resistance panels and control equipment, etc., for Central Trust of China, U.S. Aid Div., 96 Po Ai Rd., Taipei, Taiwan. (Invitation No. 218-D). B.o.T. (Ref.: CRE 18936/53).*

July 15.—New Zealand. Dunedin's Electricity Dept. invites tenders for supply of tension and suspension insulator sets for 110 kV transmission line. Documents from City Electrical Engineer, P.O. Box 513, Dunedin B.o.T. (Ref.: CRE 19270/53).*

July 17.—South Africa. Supply of two 15,000 kVA three-phase automatic on-load tap-changing transformers for City of Durban Electricity Dept. Normal voltage ratio at no load 33,000/6,600 V. Town Clerk, Municipal Buildings. B.o.T. (Ref.: CRE 19129/53).*

July 28—New Zealand. Supply of 45 V alarm relays, Sangamo Weston Model S54 or equivalent, range 46-54 V, resistance about 6,000 ohms, for Post and Telegraph Dept. Tender No. P. and T. 150/6231. B.o.T. (Ref.: CRE 19835/53).*

July 29—Australia. Queensland State Electricity Commission requires supply, maintenance etc. of one 175 kW alternator for Longreach Shire Council. Spec. No. 384. Spec. may be seen at 409-410 Strand, W.C.2. B.o.T. (Ref.: CRE 19609/53).*

Your Queries — Answered

"Vogue" washing machines, address for spares? S.W.—Metalcraft Mfg. Co. (Canada), Ltd., 37 Berners St., London, W.1. (23058)

Hearing aids marked A. Makie, London, makers of? J. D.—A. Makie, 9 St. Peters Sq., W.6. (23067)

"Radio-lectric" fires, makers of? B.B.—Falk Stadelmann and Co., Ltd., 91 Farringdon Rd., E.C.1. (23071)

"Saref" irons, makers of? T.B.—Saref Electrical Appliances Ltd., 20 Artillery Lane, E.1. (23078)

Goffering irons, makers of? C.C. — Modinstal Electric Co., Ltd., 2 Oldhams Terrace, W.3, produce an egg-shaped iron, and Hermes Products (Export) Ltd., Munster Park Works, Gowan Avenue, S.W.6, produce a mushroom-shaped which could be used for similar purposes. (23085)

"Neo-K-Tex" jointing material, makers of? E.E.—Kautex Ltd., Elstree Way, Elstree, Herts. (23108)

"Vactric" refrigerators, repairers of? T.E.—The rights, etc., on this refrigerator were acquired by Coldair Ltd., 719 North Circular Rd., N.W.2, in 1934. (23116)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Aug. 20.—India. Bombay Electric Supply and Transport Undertaking invites tenders (spec. no. E.S. 104/53) for supply of 22 kV and 6·6 kV switchgear and accessories for main receiving stations at Grant Rd. and Apollo. B.o.T. (Ref.: CRE 18201/53).*

CONTRACTS PLACED

Blackpool T.C. Supply of 75 decorative street lanterns, General Electric Co., Ltd., £2,190.

Dewsbury T.C. Electrical work in 126 houses on Wakefield Rd. estate, £3,295, and same in 66 houses on Headfield Rd. estate, £1,647, Hammerton and Waring Ltd.

Leeds. Supply of street lighting equipment: 500 time switches, Venner Time Switches, Ltd., £1,687; 165 sodium lamps, lanterns and control gear, Crompton Parkinson, Ltd., £3,626.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	252 0 0	—
LEAD, good soft pig (foreign)	88½-88¾	108 0 0
TIN (99·99·76%) ... ...(Cash)	685-687½	—
,, ... (3 months)	682-682½	—
ALUMINIUM, commercial purity (del.)	161 0 0	—
ZINC	70-70½	88 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	51 10 0	—
Mild Steel Tape (0·04 in.)	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Universal Refrigerators Ltd. Petition for winding-up presented and directed to be heard at Royal Courts of Justice, London, on June 22. Interested persons should communicate with R. Graham Page, solicitor, Whitehall House, 41 Whitehall, S.W.1, by June 20. Meeting of creditors will take place tomorrow (Friday) at 69-73 Cannon St., E.C.4, at 11.30 a.m.

Electronics (Liversedge) Ltd. Resolution for voluntary winding-up passed at meeting on June 5 when W. Dargie, C.A., Atlas Chambers, King St., Leeds was appointed liquidator.

Wellgate Electrical Co. Ltd. Meeting of members will be held at offices of W. H. Cork, Gully and Co., C.As, 19 Eastcheap, E.C.3, on July 27 at 2.30 p.m., to receive liquidators' report. Meeting of creditors will follow at 3 p.m.

Mayfield Electrics Ltd. N. W. Osborne of 11-12 Finsbury Sq., E.C.2, has been appointed liquidator by creditors.

Milward (Electrical) Ltd. Liquidator, R. K. Clark, of Somerset House, 37 Temple St., Birmingham 2, released as from May 30.

Lloyd-Davies and Booker (Electrical) Ltd. As from May 30, liquidator, R. K. Clark of Somerset House, Temple St., Birmingham, has been released.

Element Manufacturing Co. (Birmingham) Ltd. Liquidator, R. K. Clark of Somerset House, Temple St., Birmingham, released as from May 30.

BANKRUPTCY ACTS

Dividends

Bangor. David L. Smith electrical engineer of Midland Bank Chambers, Cefn Rd., Old Colwyn. First and final dividends of 2s. 6d. in £ payable at 5 Rumford Place, Liverpool 3, on July 1.

Boston. Frederick D. Ingall, trading as Ruskington Radioelectrics at High St., Ruskington. First and final dividends of 4¾d. in £ payable at Official Receivers' Office, 22 Regent St., Park Row, Nottingham, on June 27.

TRADE NOTES

Beama Contract Price Adjustment Formulae.—*For Electrical Machinery and Equipment.* For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay of adult male labour at June 13, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material"—the index figure for Materials used in the Electrical Machinery Industry, published in the Board of Trade Journal on June 13, 1953, is 151·2.

For Turbo-Generating and Allied Plant. For purposes of calculating variation in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at June 13, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material"—the index figures published in the Board of Trade Journal on June 13, 1953, are: Materials used in Mechanical Engineering Industries—143·4. "Blast Furnaces and Iron and Steel Melting and Rolling (40 and 41)"—144·5. The price of brass condenser tubes ¾in. o/d. 18 SWG published in The Metal Bulletin on June 12, 1953, is 3s. 8½d. per lb.

For Outstanding Contracts covered by the B.o.T. Intermediate products Index. For purposes of calculating variations in (*a*) "Rates of Pay"—the rate of pay for adult male labour at June 13, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material"—the index figure for Intermediate Products published in the Board of Trade Journal on June 13, 1953, is 358·1.

New Factory.—Subject to the clearance of legal formalities, the Grenfell factory at Aberbargoed had been re-allocated by the Board of Trade to Treforest Electrical Services Ltd., a subsidiary of South Wales Switchgear Ltd.

New Office.—Short Bros. and Harland Ltd. are opening a London design office at Ozonair House, Longmore St., Victoria, S.W.1. This will be in addition to their London headquarters.

Holidays.—The Wandsworth works of Wandleside Cable Works Ltd., will be closed from Friday evening, June 26 until Monday morning July 13.

The East Pilton works of Bruce Peebles and Co. Ltd., will close from Friday evening, July 3, till Monday morning, July 20.

New Branch.—Giles Electrical Engineer (Northern) Ltd. have opened a branch at 26 Ellison Place, Newcastle-on-Tyne. Tel.: Newcastle 27877.

Change of Address.—Saref Electrical Appliances Ltd. are moving next week to Coastal Chambers, Buckingham Palace Rd., S.W.1.

BUSINESS PROSPECTS

Aberdeen. It is proposed to build a primary school at Mastrick at estimated cost of £101,060.

Ashington U.D.C. Construction of 80 houses in Darnley Rd. Engineer and Surveyor, Town Hall.

Barnsley. Mining and Technical College is to be extended at cost of £500,000 and work on first part is due to start in a few months.

Berwickshire. Sketch plans approved for extensions and reconstruction at Coldstream secondary school.

Biggleswade R.D.C. Plans being prepared for 40 houses each at Clifton, Shefford and Stotfold, 10 at Meppershall, 8 at Mogerhanger and 6 at Sutton.

Blyth. Town Tailors Ltd., Mabgate, Leeds, are to build large factory.

Bolton T.C. Erection of 50 dwellings on Adrian Rd. estate. Housing Director, Town Hall.

Bournemouth. Laboratory costing £26,000 is to be built at Royal Victoria Hospital, Boscombe.

Brentwood. Approval given to erection of junior school at Pilgrim's Hatch. Cost estimated at £52,150.

Carlisle T.C. Construction of eight shops and flats at Harraby. City Engineer, L. J. A. Stow, 18 Fisher St.

Coventry. W. E. Jones Ltd. are seeking planning permission to extend their works.

Crieff (Perth). Dean of Guild Court has approved construction of additional storey to girls' school at Morrison's Academy.

Croydon. H. McIntosh and Partners, 33 High St., are architects for £15,000 additions to factory of Creed and Co. Ltd.

Durham. Application to be made to borrow £5,284 for supplying electricity to 300 houses in Sherburn Rd. estate and Hatfield View.

Durham. Scheme being considered for installing electric lighting at Bishop Auckland St. Anne's School. Cost estimated at £1,300.

East Riding. Erection of primary school at Leconfield. County Architect, County Hall, Beverley.

Edinburgh. Dean of Guild Court has approved erection of post office store and offices on Sighthill industrial estate at estimated cost of £140,000.

Epping R.D.C. Thirty-six houses are to be built at the Hoo, Harlow.

Gateshead. Revised plans prepared for total of 422 houses on Black Hill site. Robert Hirst and Co., the Bradford raincoat manufacturers, are to build factory on Team Valley trading estate.

Guildford T.C. Erection of 30 dwellings on Cardinals estate, Tongham. J. W. Snape, engineer and surveyor, Millmead House.

Guisborough (Yorks). Cyril Bielby is to convert Carlton Ballroom into cinema.

Hampshire. Erection of secondary schools for county council. County Architect, The Castle, Winchester.

Harrogate. H. Webster and H. Patefield are architects for new factory in Hookstone Rd. for Robert Hirst and Co., Ltd., Regent Parade. Work expected to start in autumn. Architects are at 6 Vernon St., Leeds.

Hoo (Kent). Plans in hand for erection of the Hundred of Hoo secondary school. Estimated cost £148,000.

Lanarkshire. Wylie, Shanks and Wylie, 120 Blythswood St., Glasgow, are architects for new factory on Newmains Industrial Estate. Estimated cost £130,000.

London. City Corpn. has approved public cleansing depot, administrative offices at estimated cost of £800,000. Also, Sibleys (1922) Ltd. are to erect factory in Stewarts Rd., S.W.

Lowestoft T.C. Council has approved erection of factory in Raglan St. for Bally's Shoe Factories (Norwich), Ltd., Queen St., Norwich. It is proposed also to erect 36 flats in Raglan and Jacobs Streets; as well as 56 houses in Hollingsworth Rd. and Montgomery Ave.

Malden (Surrey). Sketch plans approved for first instalment of secondary school in Clarence Ave. Cost of this stage will be £39,247.

Melton and Belvoir (Leic.) R.D.C Approval given to plans for 60 houses and 4 blocks of flats at Old Dalby.

Middlesex. Approval sought for installation of 17 battery chargers at fire stations.

Neath (Glam.). S. Wales Aluminium Co., Ltd. are to build new mill at their works at Rhesla, Resolven. Estimated cost £200,000. Architect is R. Mealings, Brook End Estate Office, Brook Lane, King's Heath, Birmingham.

Newcastle-on-Tyne T.C. Construction of 21 flats at Heaton and 81 houses on Kenton North estate. City Architect, 18 Cloth Market.

Newcastle-on-Tyne. Extensions to mental hospitals costing £250,000 being considered. They include £50,000 extension to St. Luke's Hospital, Middlesbrough. Approval given to erection of five-storey block of flats in Elswick St.

Newcastle-on-Tyne. Plans approved for £142,054 Stocksfield Ave. primary school.

Northfleet (Kent). Second stage of construction of secondary school for girls is estimated to cost £60,000

Northumberland. New primary school to be built on Longbeaston estate is to cost £167,854.

Nottingham. Building programme for next year has been submitted to M.E. It includes Worksop secondary technical school (£154,387); Ley Lane secondary school at Mansfield Woodhouse (£140,250); Arnold Lane secondary school, Carlton, (£140,250); Bancroft Lane secondary school, (£140,250); phase 2 of Mansfield College (£101,830); and numerous other projects.

Ockenden (Essex). Approval given for erection of £85,800 primary schools at Bonnygate and Kennington.

Paisley T.C. Dean of Guild Court has approved erection of 72 houses in Glenburn development area.

Rotherham. Plans submitted for new factory in Bawtry Rd., Brinsworth for British Oxygen Co. Ltd. Also Plessey Co. Ltd. are to extend their factory in Fitzwilliam Rd.

South Shields. Construction of 109 houses on Simonside estate. Borough Engineer, Town Hall.

Stretford. Plans approved for factory extensions in Darwen St. for E. S. Bailey and Co. Ltd.

St. Marylebone B.C. Planning approval received for erection of 17 flats, consulting rooms, etc. costing £117,500, in Wimpole St. and Harley Place. Scheme

(*Business Prospects contd.*)

prepared by S. Tatchell and Son and Partners, Cliffords Inn, Fleet St., E.C.4.

Salford T.C. Sixteen shops with flats and maisonnettes above are to be built in St. Stephen's Street.

Southborough (Kent). Additional accommodation costing £120,000 to be provided at secondary school.

Sunderland T.C. Council is to carry out £10,000 scheme for installing electricity in place of gas in 263 houses on Marley Pots estate. Erection of new Hylton Redhouse primary and infants' school. Borough Architect, H. C. Bishop, Grange House, Stockton Rd.

Todmorden. Walsden Bleaching and Dyeing Works Ltd. propose to extend their Ramsden Wood Rd works. Similar addition contemplated by Wycombe Fillings Ltd. at their Burnt Acres premises. Plans submitted in both cases.

Tullamore U.D.C. Erection of 110 houses in district. Town Clerk, Tullamore.

Tynemouth. Revised plans approved for £92,000 Monkhouse primary school. Also, G. H. Gray and Partners, Camden St., North Shields, are architects for factory alterations at West Chirton for Welch and Sons, Ltd.

Wanstead and Woodford T.C. Tenders may soon be invited for construction of 56 flats in Broomhill Road.

Washington (Dur.). Extra storey to be erected at offices of Joseph Cook (1930), Ltd., Washington Steelworks. Architects are A. H. Fennell and Co., Bridge End Chambers, Chester-le-Street.

West Bromwich. McArthur (Steel and Metal) Ltd., Paradise St., are to build new premises.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Bean Electrical Services Ltd., 16 High St., Sandown, I.o.W. Electrical engineers, general electrical installation contractors, etc. Cap.: £100. Dirs.: C. A. Masters and G. W. Bean.

Chalvey Engineering Ltd. To promote rational heating of homes and buildings in interests of both comfort and fuel economy by bringing into association interests representing heating engineers and fuel distributors, etc. Cap.: £100. Dirs.: to be appointed by subs. Subs.: M. Reid, River House, Petworth, Sussex, W. H. Sharland, Long Close, Hayling Island, W. L. Boon and L. J. Fowler.

Fluolet (Great Britain) Ltd., 15 Sun St., E.C.2. Manufacturers of and dealers in electric signs of all kinds, etc. Cap.: £1,000. Dirs.: M. Hauser and Mrs. C. Hauser.

F.S.D. Ltd. To carry out research into use of wind as means for production and storing of energy, power, fuel, chemicals and other by-products and to carry on business of electrical, mechanical, chemical and general engineers, etc. Cap.: £100. Dirs.: A. MacIntosh, S. C. Joseph and W. Moore and W. K. Wasdell, addresses not stated. Subs.: B. G. Diggines, 348 Station Rd., Knowle, Warwicks; and Hilda F. Grice, 259, Lichfield Rd., Four Oaks.

Hunt and Ford Ltd. Electricians, electrical and mechanical engineers, etc. Cap.: £100. Dirs.: P. C. Hunt, 19 Westwood Avenue, Ipswich, and L. Ford, 25 Navarro St., Ipswich.

Industrial Vacuum Cleaners Ltd. Manufacturers of and dealers in vacuum cleaners, suction plant, etc. Cap.: £1,000. Dirs.: not named. Subs.: C. G. Walton and G. N. Bailey, 35/7, King St., Luton.

Lind Instrument Co. Ltd., 13 Lind Road, Sutton, Surrey. To exploit patents, and patent rights, and carry on business of importers and exporters of and dealers in scientific instruments, etc. Cap.: £100. Dirs: H. C. Long and C. J. White.

L.L. Products (Manufacturing and Trading) Ltd., 18 Queen Anne St., Harley St., W.1. Heating, ventilating, electrical and general engineers, etc. Cap.: £100. Dir.: O. Wilhelm.

M.G. Installations Ltd., 28 Crouch St., Colchester. To take over business of electrical contractors and retailers carried on by M.G. (Colchester) Electric, Ltd. Cap.: £2,000. Dirs.: S. E. Cawthra, S. A. Martin and H. C. Lait.

Refrigeration Sales and Service (Kent) Ltd., 51 Cheriton High St., Folkestone. Refrigeration and cold storage engineers etc. Cap.: £2,000. Dirs.: F. Tebbett, J. Scherer and C. Beeching.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Arrell. 715,358. Class 9. Electrical instruments and apparatus and television aerials, etc. R. Lowther, Ltd., 100a St. Vincent St., Ancoats, Manchester 4.

Casonic. 715,436. Class 17. Electrical insulation materials made from ceramics. The Plessey Co., Ltd., 56, Vicarage Lane, Ilford, Essex.

Cresta. B714,212. Class 11. Refrigerators and refrigerating machinery. Insulations and Constructions Ltd., St. John's Works, St. John's Road, Tylers Green, Penn, Bucks.

Crinothene. 715,898. Class 17. Sheet material made of plastics. Imperial Chemical Industries Ltd., Imperial Chemical House, Millbank, S.W.1.

Diax. 715,341. Class 10. Diagnostic X-ray tables. Philips Electrical Ltd., Century House, Shaftesbury Ave., W.C.2.

Isoplate. 716,831. Class 11. Electrical heating appliances. Isopad Ltd., 13/17 Rosemont Road, N.W.3.

Magidisk. 715,867. Class 9. Sound reproducting apparatus. Birmingham Sound Reproducers, Ltd., Claremont Works, Old Hill, Stafford.

W in design. 714,420. Class 9. Alternating current rectifiers; photo-electric cells, electric apparatus for regulating current and voltage, mechanical and luminous signs, railway signals, etc., Westinghouse Brake and Signal Co., Ltd., 82 York Way, King's Cross, N.1.

Aerite. B714,300. Class 12. Pumps and inflators. Walters and Dobson Ltd., 49 Bailey St., Sheffield 1.

MEETINGS TO NOTE

MONDAY, JUNE 22

E.C.A. CONFERENCE. Opens today at Bournemouth, continuing until June 24.

N.R.E.I.C. Annnal General Meeting. I.E.E., Savoy Place, W.C.2.—2.30 p.m.

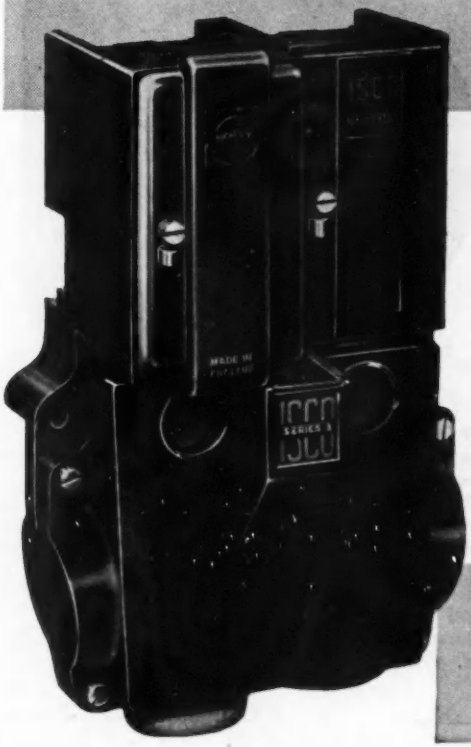
EXHIBITION DIARY

Business Efficiency. 40th show opened at Olympia on June 16 and closes on June 26.

Safety and Factory Efficiency. Opens at Bingley Hall, Birmingham, on June 19 and continues until the 26th.

Royal Highland Agric. Show. To be held at Alloa between June 23 and 26.

INSULATED SERVICE FUSES



The following are interesting features:—

Double and Four-pole models with combined sealing chambers.

Single-pole with Neutral Connector Boxes and separate 2 and 4-pole Sealing Chambers.

Cartridge Fuse-links to B.S.88:1947.

For cable conductors up to .04 sq. in. or up to .06 sq. in.

With single or double entry Terminals.

All current carrying parts tinned.

UP TO 60 A 250 V

Double-pole Insulated Service Fuse arranged for one fuse and one neutral connector with combined 4-entry sealing chamber.

● In the range of HENLEY Insulated Service Fuses there is an arrangement to meet your requirements. Please ask for Catalogue 43.

HENLEY
ELECTRICAL DISTRIBUTION EQUIPMENT

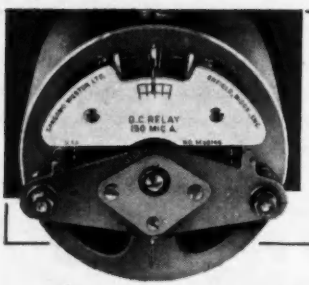
● DELIVERY FROM STOCK

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.,
51-53 HATTON GARDEN,
LONDON, E.C.1.

Weston

MOVING COIL RELAYS

This modern range of relays is ideal for all Laboratory or Industrial Purposes. Built on the permanent-magnet moving coil principle, unaffected by external magnetic fields, the precious metal contacts will not oxidise or tarnish, and the high torque developed ensures positive contact pressure. Supplied in Bakelite casing. Most applications call for special requirements and enquiries should, therefore, enclose a diagram of the circuit to be closed and state (a) High and/or low contact adjustment; (b) mounting position; (c) resistance; (d) values of current and voltage in local circuit and whether D.C. or A.C.; (e) values of resistance and any inductance or capacitance in local circuit; and (f) any special accuracy required. Every 'Weston' relay is specially designed to give the best possible performance for its individual purpose. (The Model illustrated is S54).



ACCURACY OF ADJUSTMENT. Special note should be made of the reduction gearing which enables the user to make accurate adjustment with absolute ease. The accuracy and rigidity of the mounting ensures constant centring after adjustment. Yet another special 'Weston' feature.

SANGAMO WESTON LIMITED

Enfield, Middlesex. Tel: Enfield 3434 (6 lines) & 1242 (4 lines). Grams: Sanwest, Enfield

Branches:

London, Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

LITHERLAND URBAN DISTRICT COUNCIL

BRIDGE ROAD—SODIUM STREET LIGHTING

TENDERS are invited for the supply and installation of LANTERNS, LAMPS, CONTROL GEAR and CONCRETE COLUMNS, for Class "A" lighting.

Contract documents and drawings may be obtained from the Engineer and Surveyor, Town Hall, Liverpool 21, on payment of a deposit of £1 1s. which will be returned on receipt of a bona fide tender.

Tenders to be delivered to the Clerk of the Council, Town Hall, Liverpool 21, not later than Monday, June 29, 1953. (E 79)

ST. NEOTS URBAN DISTRICT COUNCIL

Huntingdon Road Housing Estate

ADDITIONAL STREET LIGHTING

TENDERS are invited for the supply and erection, in positions indicated on plan available at this office of 15 spun concrete columns and lanterns to match existing installation and complete with 100 W tungsten filament lamps together with wiring between service terminations. The work of connection to the electricity supply will be undertaken by the Eastern Electricity Board. Further details may be obtained from the Council's Surveyor at the address below and sealed tenders in envelopes endorsed "Street Lighting" must be sent to the undersigned not later than July 4 next. The Council do not undertake to accept the lowest or any tender.

L. HENDERSON,
Clerk to the Council.

Council Offices,
Huntingdon Street,
St. Neots,
Hunts.
June 8, 1953. (E 133)

COUNTY BOROUGH OF WALLASEY

ELECTRICAL INSTALLATION

at Leasowe Secondary Modern School and The Birket Primary School.

TENDERS, to reach the undersigned by July 13, 1953, are invited for the above. Specifications and Forms of Tender obtainable from the Borough Architect, Town Hall, Wallasey, on payment of a deposit of £1 1s. 0d. for each of the works. The deposit is returnable on receipt of a bona-fide tender, not subsequently withdrawn, or the return of documents prior to the closing date.

A. G. HARRISON,
Town Clerk.
(E 134)

BENTLEY-WITH-ARKSEY URBAN DISTRICT COUNCIL

SODIUM DISCHARGE LIGHTING
GREAT NORTH ROAD

TENDERS are invited for the lighting of about 2 miles of trunk road, as follows:—

(a) Supply of lanterns, lamps and control gear.

(b) Supply and erection of columns, fitting and wiring of equipment.

(c) Provision of underground cable.

Tenders may be submitted for any or all of the above work, each of which will form a separate contract.

Drawings, Specification, Bills of Quantities and Form of Tender may be obtained from, and the Conditions of Contract inspected at, the office of the Engineer and Surveyor at the address below, on deposit of two guineas, returnable only on receipt of a bona fide tender and the return of all documents.

Sealed tenders in envelopes not bearing any mark

(Continued in next column)

(Continued from previous column)

indicating the name of the sender, and endorsed "Great North Road Lighting," must reach the undersigned not later than Monday, July 6, 1953.

The Council does not bind itself to accept the lowest or any tender.

W. H. CARLILE,
Clerk to the Council.

Council Offices, Cooke Street,
Bentley, Nr. Doncaster.
June 5, 1953. (E 112)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

CITY OF LIVERPOOL EDUCATION COMMITTEE

COLLEGE OF TECHNOLOGY

Byrom Street, Liverpool, 3

APPLICATIONS are invited for the appointment of ASSISTANT, Grade "B" (full time), Department of Electrical Engineering. Duties to commence September 1, 1953, or as soon after as possible.

Salary: (Men): £490 by £25 to £765, plus appropriate allowances for training and qualifications. Increments allowed for industrial experience.

Applicants should possess Graduate qualifications in electrical engineering, preferably a university degree including heavy current work. Industrial experience and some teaching practice is desirable. The ability to teach mathematics and physics to engineering students would be an advantage.

Application forms and further particulars from H. S. Magnay, M.A., Director of Education, 14 Sir Thomas Street, Liverpool, 1. N.B.—Completed forms should be returned to him within 14 days of the appearance of this advertisement.

THOMAS ALKER,
Town Clerk and Clerk to the Local Education Authority.
(JA 3239) (E 190)

GOVERNMENT OF KUWAIT

DIESEL POWER STATION SHIFT ENGINEERS required for service with the Government of Kuwait, Persian Gulf. Applicants, preferably not more than 35 years of age, should have some technical qualifications, together with good experience in the operation and maintenance of Diesel engines and generators, and also sufficient electrical knowledge of an a.c. distribution system to be able to operate the power plant in the station efficiently. Steam power plant operation experience would be advantageous, as at a later date a steam power station will be operating and it might be possible to transfer the services of the Diesel power station shift engineers over to the steam station. The starting consolidated salary offered is at the rate of £1,500 to £1,690 per annum, according to experience. Free furnished quarters and free medical attention are provided; or an allowance in lieu thereof. The first year will be probationary, and if satisfactory, home leave will be granted at the end of three years' complete service. Married accommodation cannot be promised within one year.

Applications, stating age and giving full details of qualifications and experience, should, in the first instance, be addressed to the Secretary, Ewbank and Partners, Ltd., 10-11 Grosvenor Place, London S.W.1. (E 106)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

Northmet Sub-Area, Letchworth District. 42/53R.
SENIOR SERVICE CENTRE ASSISTANT

Candidates should be capable of taking charge of a service centre, controlling service centre staff and handling consumers' inquiries efficiently. They should have had extensive sales and consumer service experience and possess a thorough knowledge of appliances, contracting, and the application of standard tariffs. The possession of the E.D.A. salesmanship diploma or E.A.W. certificate will be an advantage.

The salary will be in accordance with Grade 2 (£460 by £20 to £520) of the National Joint Council Salary Agreement.

Apply to the District Manager, Letchworth, Eastern Electricity Board, Works Road, Letchworth, Herts.

Suffolk Sub-Area, Bury St. Edmunds, District 40/53R
FIRST ASSISTANT DISTRICT ENGINEER

Candidates should have had a sound technical training and wide experience in the planning, construction, operation and maintenance of overhead and underground systems (including substations) up to and including 33,000 V in a predominantly rural area.

The salary will be in accordance with Class "E," Grade 5, of the National Joint Board Salary Agreement, commencing at £740.

Apply to the District Manager, Bury St. Edmunds, Eastern Electricity Board, 4 Cornhill, Bury St. Edmunds, Suffolk.

Future salary and conditions of service for the above appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the manager concerned within 14 days of the appearance of this advertisement. (E 174)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts in the Central Gloucestershire Sub-Area. Technical qualifications are desirable.

SECOND ASSISTANT DISTRICT ENGINEER
Cheltenham District (Ref. No. T/161)

Experience necessary in the preparation of schemes and estimates for extensions and development, supervision of the installation of underground cables and construction of overhead lines and sub-stations, and the operation and maintenance of all classes of distribution and sub-stations. Salary £649 to £681 per annum (N.J.B. Class "E," Grade 7.)

SECOND ASSISTANT DISTRICT ENGINEER
Dean Forest District (Ref. No. T/165)

SECOND ASSISTANT DISTRICT ENGINEER
Severn Vale District (Ref. No. T/166)

Experience necessary in all branches of distribution work, including construction and maintenance of mainly rural distribution systems including sub-stations, sub-station equipment and street lighting. Salary in each case £633 to £643 per annum (N.J.B. Class "D", Grade 7). (Classification in respect of Severn Vale District 1952-53 based on unit sales after devaluation of approximately 46 million units.)

Apply within 14 days quoting reference number and stating age, experience, present salary and position to Manager, Central Gloucestershire Sub-Area, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(E 175)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

FIRST ASSISTANT CONTROL ENGINEER
Glasgow Control Area

APPLICATIONS are invited for the position of First Assistant Control Engineer in the Control Room, which is located in Divisional Headquarters of the South West Scotland Division, Broomhill Drive. The area controlled covers the South West and South East Scotland Divisions. The salary for the position, which is superannuable, will be in accordance with Schedule "C," Grade 5, of the National Joint Board Agreement within the range £649 to £858 per annum.

Candidates should have electrical and mechanical experience in the operation of generating stations. Technical attainments will be taken into account in the selection of the candidates.

Applications, on Form A.E.6, which may be obtained from the above address or from any Divisional Office of the Authority, should be forwarded to 168 Broomhill Drive, Glasgow, W.1, before July 6, 1953. (E 163)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF JUNIOR ENGINEERS
Sub-Area Mains Engineer's Department, Manchester

APPLICANTS should possess the H.N.C. in electrical engineering or an equivalent qualification, and should have a basic works training of not less than two years.

Successful candidates will be required to work in Manchester and surrounding districts, and will be given the opportunity to gain experience in various sections of the Mains Engineer's Department.

Salary scale: £402-£547 p.a., Class "M," Grade 21/17. N.J.B. conditions.

Applications for the above post to Sub-Area Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester, P.O. Box 493, by June 27, 1953.

APPOINTMENT OF GENERAL ASSISTANT ENGINEER,
Mains Planning and Construction,
Sub-Area Headquarters, Castle Green, Kendal.

Applicants should have had experience in planning and construction of H.V. and L.V. underground and overhead networks. Experience of 33 kV work will be an advantage.

Applicants should hold the H.N.C. (Elect.) or its equivalent.

Salary scale, £552-£573 p.a., Grade J.13. N.J.B. conditions.

Applications to Sub-Area Manager, The North Western Electricity Board, No. 6 Sub-Area, Castle Green, Kendal, by June 27, 1953. (E 159)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the position of—

POWER STATION SUPERINTENDENT
Norwich Generating Station

Salary, Class "F," Grade 1, £1,087-£1,134 per annum.

Applicants should have received a thorough technical and practical training and have held a position of responsibility, involving control of technical, operating and administrative staff, in a generating station. They should preferably be Corporate Members of one of the recognised engineering institutions.

The successful applicant will be expected to reside within a reasonable distance of the generating station and will be responsible for the efficient local management, operation and maintenance of the station.

Applications, giving age, details of qualifications and experience, should be submitted to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, not later than July 4, 1953.

W. N. C. CLINCH,
Controller.
(E 164)

LONDON ELECTRICITY BOARD

DEMONSTRATOR (FEMALE)

APPLICATIONS are invited for the above position in the North Western Sub-Area at Hampstead, N.W.3.

Applicants should be suitably qualified, holding the E.A.W., or other approved certificate, including electrical housecraft, and have experience in conducting demonstrations at Service Centres and in general Service Centre duties. They should also be experienced in advising consumers on the selection and use of domestic appliances, both at the Service Centre and on consumers' premises.

The post is graded within the National Joint Council agreement (Administrative and Clerical Grades) as Grade 1, i.e. £380 to £470 per annum, plus the appropriate London allowance.

Application forms, obtainable from Establishments Officer, 46-47 New Broad Street, E.C.2, to be returned by June 30, 1953. Please enclose addressed foolscap envelope and quote Ref. V/1614/T. on all correspondence. (E 162)

GOVERNMENT OF KUWAIT

ELECTRICAL MAINTENANCE ENGINEER required for service with the Government of Kuwait, Persian Gulf. Applicants, preferably not more than 35 years of age, should have some techn'cal qualifications and good electrical engineering training and subsequent experience with switchgear and the various protective relays, transformers, cabling and electrical machinery. Steam and power plant, and Diesel plant operating experience would be an advantage. The starting consolidated salary offered is at the rate of £1,500 to £1,600 per annum according to qualifications and experience. Free furnished quarters and free medical attention are provided or an allowance in lieu thereof. The first year will be probationary, and if satisfactory, home leave will be granted at the end of three years' complete service. Married accommodation cannot be promised within one year. Applications, stating age and giving full details of qualifications and experience should, in the first instance, be addressed to the Secretary, Ewbank and Partners, Ltd., 10-11 Grosvenor Place, London S.W.1. (E 122)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY Nos. 127/53 and 128/53. STATION CHEMIST and ASSISTANT STATION CHEMIST respectively at new Chadderton H.P. Generating Station, Nr. Oldham. Salary £729-£758 for station chemist. Assistant's salary will depend on qualifications and experience, but will not be less than £573. Chemistry degree or A.R.I.C. desirable. Minimum qualification, H.N.C. Power-plant experience not essential provided applicant has wide experience of chemical testing of coal, water and oil.

Vacancy No. 129/53. ASSISTANT SHIFT CHARGE ENGINEER at Hartshead Generating Station, Stalybridge. Salary £641-£667 (G.9).

Vacancy No. 130/53. ASSISTANT SHIFT CHARGE ENGINEERS at new Roosecote Generating Station, Barrow. Salary £641-£667 (G.9).

Vacancy No. 131/53. STATION SHIFT CONTROL ENGINEER at Agecroft H.P. Generating Station, Nr. Manchester. Salary £608-£630 (G.10).

Vacancy No. 136/53. DEPUTY POWER STATION SUPERINTENDENT at Westwood Generating Station, Wigan. Salary £971-£1,014 (G.3). Must have wide experience of modern power-plant operation, maintenance and administration, and suitable technical qualifications.

Separate applications for each vacancy, quoting vacancy number, to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before June 27 (Vacancy Nos. 127/53 and 128/53, July 18). (E 165)

LONDON ELECTRICITY BOARD

ENGINEERING DRAUGHTSMEN

APPLICATIONS are invited for three appointments as Engineering Draughtsman based at the Southern Sub-Area Drawing Office at Beckenham, Kent. The successful applicants may be required to work anywhere within the Sub-Area.

Candidates should have had a good general and technical education and be experienced in one or more of the following subjects: Engineering Drawing; Plant lay-out in Substations; Layouts and Site Plans of Mains Work; Electrical Diagrams.

The posts are graded under Schedule "D" of the National Joint Board agreement as Grade 6, £458 to £595 7s. per annum inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46-47 New Broad Street, E.C.2, to be returned completed within 10 days of the publication of this advertisement. Please enclose addressed foolscap envelope and quote Ref. V/1624/T. on all correspondence. (E 139)

CROWN AGENTS FOR THE COLONIES

MASTER, TECHNICAL EDUCATION (ELECTRICIAN) required for the Gold Coast Local Civil Service for two tours of 18 to 24 months in first instance. Commencing salary, etc., according to age, qualifications and experience in scale £980 rising to £1,230 a year. Outfit allowance £60. Gratuity of up to £150 a year. Free passages. Liberal leave on full salary. Candidates must possess an Ordinary National Certificate or C. & G. Final Certificate in Electrical Engineering or an equivalent qualification and have had good industrial experience.

Apply in writing to the Crown Agents, 4 Millbank, London, S.W.1, stating age, name in block letters, full qualifications and experience and quoting M2C/29142/EE. (E 137)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

OPERATION AND EFFICIENCY ENGINEER required at Walsall Generating Station. N.J.B. service conditions, superannuable appointment. Salary within Schedule "A," Grade G5, commencing at £831 p.a.

Applicants should hold at least the Higher National Certificate in mechanical and/or electrical engineering and should preferably be corporate or graduate members of one of the senior engineering institutions. Wide experience in the operation and maintenance of a large generating station is essential.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13 by July 4, 1953. (E 180)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

ASSISTANT ENGINEER (Handling—Shift)—Littlebrook Power Station. The successful applicant, who must be capable of controlling labour, will be responsible on shift for the coal and ash handling plant and associated equipment including mobile equipment. N.J.B. Conditions of Service and salary, Class "M," Grade 12, £740 5s. 0d. p.a., including London Allowance. Applications, giving details of education, present position, experience, etc., should be received by the Station Superintendent, Littlebrook Power Station, nr. Dartford, Kent, by June 27. (E 135)

CHINA LIGHT AND POWER CO. LTD.

Kowloon, Hongkong

ASSISTANT ENGINEER

Distribution Department

APPLICATIONS are invited for the above position from suitably qualified engineers, preferably aged 30 to 35 years.

Applicants must have sound theoretical training and practical experience in the installation and maintenance of high and low voltage underground and overhead mains, static and sub-station plant and distribution equipment.

The Company operates only in the Crown Colony of Hongkong, using modern British equipment, and the position offered is progressive for a capable and experienced man.

Commencing salary is HK $1,650 per month, rising by annual increments of $35 to $2,000 with high cost of living allowance which varies in accordance with the Local Government Retail Price Index, the present allowance being: single men, $216.00; married men, $378.00; married men with children, $540.00

In addition, there is an expatriation allowance of $306.67. The average value of the Hongkong dollar is 1s.2$\frac{1}{16}$d.

An employees' provident scheme is in operation, and also a retiring fund, qualification for the latter being 20 years' service and age 55.

First-class unfurnished quarters are provided or alternative accommodation, also free passage out (P. & O., 2nd class) and return passage after completion of contract.

The successful applicant will be required to pass a medical examination.

Write, giving full particulars and when available to Box E.T. 394, L.P.E., 110 St. Martin's Lane, London, W.C.2. (E 140)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary including London Allowance and conditions of service in accordance with N.J.B. Agreement, Schedule "A" and "C." Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E.

SHIFT CHARGE ENGINEER

St. Pancras Generating Station.

Practical experience in efficient operation of medium pressure turbine and boiler plant, also e.h.t. switchgear. Character and ability to supervise all grades essential. Salary: Class "E," Grade 7, £681 9s. per annum.

ASSISTANT SHIFT CHARGE ENGINEER

Bankside "A" and "B" Generating Stations.

Assisting Shift Charge Engineers in plant operation. Salary: Class "H," Grade 9, £714 per annum.

BOILER HOUSE SHIFT CHARGE ENGINEER

Deptford West Generating Station.

Sound engineering training with experience in operation of modern boiler plant. Salary: Class "J," Grade 9, £749 14s. per annum.

ASSISTANT ENGINEER

Deptford East Generating Station.

Sound engineering training and be conversant with the operation of modern high pressure power station plant. Salary: Class "H," Grade 12, £593 5s. per annum.

Applications may be made on forms obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (E 179)

SCOTTISH GAS BOARD (GLASGOW DIVISION)

Glasgow District

ELECTRICAL ENGINEERING ASSISTANT

A VACANCY exists in the Engineering Section of the Glasgow District for an Electrical Engineering Assistant.

Applicants must possess the Higher National Certificate in appropriate engineering subjects, or be corporate members of the Institution of Electrical or Civil Engineers. They must be able to prepare schemes and relative specifications, drawings, etc., embodying up-to-date electrical equipment, as applied to the gas industry, and be able to supervise contracts and carry out all necessary maintenance tests on existing equipment.

The salary will be within Grades A.P.T. 8-10 (£585 to £765) and placing within these grades will be in accordance with qualifications and experience.

The post is superannuable and the successful candidate may be required to undergo medical examination.

Applications endorsed EA/EO, stating particulars of age, qualifications and experience, together with the names of two referees should reach the undersigned on or before Saturday, July 11, 1953.

D. F. YOUNG,
Divisional Controller.

30 John Street, Glasgow C.1. (E 178)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 2 (Huddersfield) Sub-Area

Halifax District.

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should be graduate members of the Institution of Electrical Engineers or possess equivalent qualifications, and should have had experience in the design, construction, operation and maintenance of overhead and underground distribution networks, substation plant and ancillary apparatus.

Salary, N.J.B., Class "G," Grade 11, £573-£596 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than July 2, 1953.

No. 4 (Leeds) Sub-Area

Leeds District

ENGINEERING DRAUGHTSMAN (MORLEY)

Applicants should be capable of preparing schematic diagrams, site and layout plans, and carry out drawing-office work required in connection with the construction of overhead lines up to and including 11 kV.

The successful applicant will be required to supervise the work of the cartographic and recording draughtsman in the operational unit and have experience in the preparation of mains records and notices of wayleave plans.

The possession of a National Certificate in electrical or mechanical engineering will be a qualification.

Salary, N.J.B., Schedule "D," Grade 6, £433-£567 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than July 2, 1953.

No. 5 (Wakefield) Sub-Area

Barnsley District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should preferably be graduate members of the Institution of Electrical Engineers and have experience in the construction, operation and maintenance of overhead and underground distribution systems.

Candidates should be prepared to reside in the district and undertake standby duties.

Salary, N.J.B., Class "F," Grade 11, £548-£565 per annum.

Wakefield District

SENIOR SALES REPRESENTATIVE

Applicants must have had practical experience in negotiating with and advising consumers in respect of new supplies and in the sale and use of equipment for domestic, small commercial or industrial installations. Preference will be given to applicants having a knowledge of street lighting.

Salary, N.J.C., Grade 2, £460 by £20 to £520 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than July 2, 1953.

No. 1 (Bradford) Sub-Area

Keighley District

JUNIOR ENGINEER

Applicants should hold the Higher National Certificate in electrical engineering and have had training and experience in the construction, operation and maintenance of high-voltage and medium-voltage overhead and underground distribution systems.

Salary, N.J.B., Class "E," Grade 15/14, £390-£445 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, not later than July 2, 1953.

(E 160)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following vacancy in the System Operation Department at Divisional Headquarters:—

GENERAL ASSISTANT ENGINEER S/13.414.

Applicants should preferably have a Higher National Certificate (Electrical) or its equivalent and should have some experience in the operation and control of inter-connected power systems, or in the operation of power station plant.

Salary N.J.B. "AX/CX" 8 £501 to £675.

Special application forms, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, must be returned by July 1, 1953. (E 177)

LONDON ELECTRICITY BOARD

JUNIOR ENGINEER (CONSTRUCTION)

APPLICATIONS are invited for the above position in the Construction Branch at Hampstead, N.W.3.

Applicants should have received a sound general and technical education at least to the Graduate I.E.E. standard. They should have completed an engineering apprenticeship with an electrical manufacturer or supply authority, and should have sound practical experience in three-phase H.V. and L.V. distribution.

The post is graded under the National Joint Board agreement as Class "J," Grade 18, commencing salary £427 per annum inclusive, rising, in accordance with Clause 35, to Grade 14, £572 5s. per annum, inclusive of London Allowance.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by June 29, 1953. Please enclose addressed foolscap envelope and quote Ref. V/1612/T. (E 161)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SYSTEM CONTROL ENGINEER (Shift) required in the No. 4/5 Sub-Area Operation Department and based on the Control Centre at Legacy, near Wrexham. Salary £690-£706 per annum (N.J.B. Class "J," Grade 10).

Duties, which will be on a continuous shift basis, will be those normally associated with switching operations and load transfers on an extensive E.H.V. system interconnecting 132/33-kV injection points and a number of hydro-electric stations.

Applicants should have had operational experience in distribution work and in sub-stations, and possess the technical qualifications necessary to enable them to become Chartered Electrical Engineers.

The appointment is superannuable and subject to medical examination.

Standard application forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham. Closing date: June 29, 1953.

(E 189)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

MAINTENANCE ENGINEER (Mechanical) is required at Wolverhampton Generating Station. N.J.B. service conditions, superannuable appointment, salary within Schedule A, Grade E6, commencing at £899 per annum.

Applicants should have wide experience in power station mechanical maintenance and should preferably possess the Higher National Certificate in mechanical engineering, or equivalent qualifications.

Application forms are available from the Establishments Officer, 53, Wake Green Road, Moseley, Birmingham, 13, to be completed and returned by July 4, 1953.

R. L. BATLEY,
Divisional Controller.

(E 136)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, DISTRIBUTION CONTROL ENGINEER (Shift Duties) at the Board's Distribution Control Centre at Fforestfach, Swansea.

Duties will cover the operation of an extensive overhead and underground high voltage network and applicants should be experienced in controlling the operation of switchgear of all voltages, transformers and associated protective equipment and must be familiar with the working of safety regulations.

Salary in accordance with Class "AX/CX," Grade 5 (£649 to £835) of N.J.B. schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by June 27, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (E 173)

SOUTHERN ELECTRICITY BOARD

DEMONSTRATOR

GREENFORD District of No. 1 (Southall) Sub-Area. Salary N.J.C. Grade 1 (£380 to £470 per annum) plus London Weighting. N.J.C. conditions of service.

Applicants should be women and qualified to advise generally on the utilisation of electric domestic appliances, to give public demonstrations of apparatus and to assist in showroom duties. The possession of an E.A.W. Certificate or equivalent domestic science qualification would be an advantage.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 2-6 Windmill Lane, Southall, and returned to him, in envelopes suitably endorsed, not later than June 29, 1953.

(E 181)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53.

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for this appointment will be on June 30, 1953.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53.

Senior Draughtsmen are required in the mechanical section of the Construction Department at North Wi ford Power Station. Candidates should have experience in one or more of the following:—

1. Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
2. H.P. and l.p. steam and feed pipework. Condensing plant and feed heating systems.
3. Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement Grade 5 (£567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D" according to experience.

Closing date for this appointment will be on June 30, 1953.

JUNIOR ENGINEER
Hinckley Power Station. Vacancy No. 58/53.

Candidates should have gained an Ordinary Certificate in Electrical Engineering and have had experience in a power station.

The salary will be in accordance with Schedule "A," Class "B," Grade 13 (£390 per annum) progressing to Class "B," Grade 12 (£404 to £423 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be on June 22, 1953.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53.

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

Closing date for this appointment will be on June 29, 1953.

SHIFT CONTROL ENGINEER
Longford Power Station, Coventry. Vacancy No. 62/53.

Applicants should have had a sound training and practical experience in a modern power station. The possession of technical qualifications is desirable.

Salary will be in accordance with Class "G," Grade 10 (£608 to £630 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be on July 1, 1953.

ASSISTANT SHIFT CHARGE ENGINEER
Burton-on-Trent Power Station. Vacancy No. 63/53.

Applicants should have had sound technical training and practical experience in operation and control of power stations and should preferably have the Higher National Certificate in Electrical and Mechanical Engineering.

The salary for this appointment will be in accordance with Class "E," Grade 9 (£587 to £800 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be on July 1, 1953.

The above appointments will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.
(E 176)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

CROWN AGENTS FOR THE COLONIES

SHIFT CHARGE ENGINEERS required for Central Electrification Scheme in Cyprus for 2 tours each of 2 years in first instance, with option of gratuity at the rate of £100 a year or becoming contributor to superannuation fund. Salary in scale £858, rising to £990 a year. Free quarters and passages. Liberal leave on full salary. Candidates must have served an apprenticeship to mechanical engineering and have had experience of oil-fired boilers and turbo-generating sets. They should preferably have had experience in the operation of a modern generating station but experience as a C.E.R.A. would be acceptable.

Apply in writing to the Crown Agents, 4 Millbank, London, S.W.1, stating age, name in block letters, full qualifications and experience and quoting M2C/30027/EE. (E 138)

A SALES MANAGER is required for London embracing an important section of a large firm manufacturing insulated electric wires and having extensive home and overseas business. Applicants should have some engineering experience, a sound knowledge of the trade and ability for selling and organisation. Applications must state age, experience and salary expected. Privacy guaranteed.—Box No. 2701, Electrical Times. (E 141)

ASSISTANT ENGINEERS experienced in the survey and construction of overhead transmission lines in Scotland, mainly wood pole types, but knowledge of tower work an advantage.—Details of age, education, experience and salary to Box No. 692, Keith & Co., Advertising Agents, Edinburgh. (E 142)

BRITISH ELECTRICITY AUTHORITY, Drawing Office Headquarters, Bankside, London, require:—

SENIOR DRAUGHTSMEN (Grades 4 and 5) and DRAUGHTSMEN (Grade 6). Candidates must have experience in power station layout or have been employed in a power station drawing office.

SENIOR DRAUGHTSMEN (Grade 5) and DRAUGHTSMEN (Grade 6) with experience in R.C. design and detail for light structures and foundations required for main Grid sub-stations.

DRAUGHTSMEN (Grade 6) with experience in layout and/or protection diagrams for 132 kV sub-stations.

Senior draughtsmen should be at least 26 years of age.

Starting salaries will be in accordance with qualifications and experience, as follows: N.J.B. Grade 4, £705 to £819; Grade 5, £595 to £705; Grade 6, £458 to £595. Pension scheme. One Saturday in four on duty.—Forms from D. Moffat, Director of Establishments, Winsley Street, London W.1. Quote ref. ET/367. (E 143)

BRITISH STANDARDS INSTITUTION requires a Chartered ELECTRICAL ENGINEER to act as secretary to committees dealing with electrical equipment. Degree in electrical engineering, experience in design of machines and transformers, and knowledge of French are desirable. Aptitude for committee work is essential. Salary grading £800 to £1,000, the starting salary dependent on qualifications and experience. Position is pensionable.—Apply in writing to Establishment Officer, B.S.I., 24 Victoria Street, S.W.1. (E 100)

DRAUGHTSMEN. The English Electric Co., Ltd., at Liverpool, have vacancies for ELECTRICAL DRAUGHTSMEN with good experience of switchgear wiring diagram work. Pensionable and progressive positions with excellent opportunities for promotion are offered to men with initiative.—Write, quoting ref. 140D, to Central Personnel Services, English Electric Co., Ltd., 336-7 Strand, London W.C.2. (E 108)

ELECTRICAL ASSISTANT required for retailers of British domestic products in Jamaica. Single man preferred, but married man without family would be considered.—Write, with full particulars, to Box 603, c/o Walter Judd Ltd., 47 Gresham Street, London E.C.2. (E 144)

ELECTRICAL ENGINEER required by food manufacturing company at Ashford, Kent. Experience of generating plant and installation, and maintenance of electrical equipment essential. This is a permanent appointment and offers good prospects. A contributory pension scheme is in operation.—A summary of previous experience, age and salary expected should be stated in application to Box No. 2717, Electrical Times. (E 167)

ENGINEERS, aged 25 to 40 years, required for senior and junior positions in test and service department (based on London). Duties involve starting up, efficiency testing and service work, chiefly on Land water-tube boilers up to power-station capacities. Experience of this or similar type of work is desirable. Applicants holding M. of T., naval watchkeeping or equivalent certificate preferred. Works apprenticeship essential. Salary from £600 to £750 per annum, according to qualifications and experience. Contributory pension scheme.—Apply in writing (only), stating age, full particulars of experience and qualifications, to Foster Wheeler Ltd., 3 Ixworth Place, S.W.3. (E 169)

ELECTRICIANS required by the Steel Company of Wales, Ltd., Steel Division, Port Talbot. Applicants should have experience on the maintenance of heavy industrial plant, including high-voltage switchgear.—Applications, in own handwriting, giving age, experience, etc., to be addressed to the Personnel Superintendent, The Steel Company of Wales Ltd., P.O. Box No. 3, Port Talbot. (E 168)

EWBANK AND PARTNERS LTD. have vacancies for MECHANICAL ENGINEERING DRAUGHTSMEN experienced in power station design and layout, pipework layout, circulating water system and with some knowledge of coal and ash handling plants. The positions are permanent and are pensionable. Free lunches are provided and a five-day week is in operation.—Applicants should write in the first instance, stating age, details of experience and salary required to the Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10/11 Grosvenor Place, London S.W.1. (E 71)

JUNIOR ENGINEER required for sales office of temperature control engineers.—Write, giving age, training and experience, to DHS, c/o The Rheostatic Co. Ltd., Slough, Bucks. (E 170)

LABORATORY ASSISTANTS for the development of instruments, meters and relays. University degree or Higher National Certificate standard required.—Apply in writing, stating age, experience and salary required, etc., marking envelopes "Meter Engineer," to Personnel Manager, Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester 17. (E 20)

LONDON MANAGER required by e.h.t. switchgear manufacturers. Essentials are: (a) comprehensive experience in the high voltage switchgear industry, (b) ability to establish and maintain contacts with top-grade executives, (c) first-class sales record, (d) A.M.I.E.E. or equivalent. Applicants should state age, technical education, previous experience, salary required. Our own staff have been informed of this vacancy.—Box No. 2703, Electrical Times. (E 145)

LONDON TRANSPORT require TECHNICAL ASSISTANTS for drawing office on layout and project works for new installations at generating stations and traction substations or in connection with the maintenance and operation of a railway electric traction supply system. Salary rising to £579 subject to satisfactory service, with additional payments for certain recognised qualifications. Medical examination. Contributory superannuation scheme after probation.—Applications within 14 days to Staff Officer (F/EV 239), London Transport, 55 Broadway, S.W.1. For acknowledgement enclose addressed envelope. (E 182)

PLUMBER JOINTER for Middle East, experienced in jointing paper cables, lead covered and armoured up to 11 kV.—Apply, stating age and experience, forward copies of testimonials, or state names to whom we may apply, to Box No. 2705, Electrical Times. (E 146)

PRODUCTION SUPERINTENDENT, aged 30-40, for electric cable works, London area.—Write, stating age, experience and salary required, Box No. 2719, Electrical Times. (E 171)

PROFESSIONAL ENGINEERS IN VARIOUS GOVERNMENT DEPARTMENTS. The Civil Service Commissioners invite applications for about 130 pensionable posts in a wide variety of mechanical and electrical engineering duties. Applications may be accepted up to September 30, 1953, but an earlier closing date may be announced.

Candidates must be under 35 on January 1, 1953, with extension for regular service in H.M. Forces and up to two years for permanent civil service. For the Post Office they must be at least 21, for the Ministry of Supply and Ministry of Civil Aviation at least 23, and for all other departments at least 25 on that date.

Generally a candidate must possess a university degree in engineering or be a corporate member of one of the professional institutions—Mechanical Engineers, Electrical Engineers, or Civil Engineers—or have passes in, or exemption from, Sections "A" and "B" of the corresponding Associate Membership examinations. Exceptionally, candidates of high professional attainment, but without the specified qualifications, may be admitted. For some posts Associate Fellowship of the Royal Aeronautical Society or an honours degree in physics will be accepted.

Inclusive salary scale (men in London), £628 (at age 25) to £970; starting salary, according to age, up to £875 at 34. Candidates entering below age 25 will start at salaries varying from £429 at age 21 to £549 at age 24. Prospects of promotion. Salaries of next higher grades are £970 to £1,280 and £1,331 to £1,536. Somewhat lower for women and in the provinces.

Further particulars and application forms from Civil Service Commission, Scientific Branch, Trinidad House, Old Burlington Street, London, W.1, quoting No. S85/53. (E 172)

RESEARCH Engineering Company at Feltham has a vacancy for an ELECTRICIAN, able to carry out installations on a small scale and routine maintenance. Some knowledge of electronics advantageous.—Reply to Box No. 2697, Electrical Times. (E 102)

SALES ENGINEER required to promote sales of standard and special types of lighting, communications and electronic cables to Government depts., research establishments, nationalised industries, etc. Existing connections essential. Remuneration by salary and commission.—Write fullest details Box No. 2707, Electrical Times. (E 147)

SALES REPRESENTATIVE required for Northamptonshire area with experience in high-quality electrical products. Connections with Government authorities, factories, wholesale and retail trades an advantage.—Applicant should own a car and live in the Northampton district.—Apply in writing to the Manager, Siemens Electric Lamps and Supplies, Ltd., 8 and 10 Albert Street, Birmingham 4. (E 183)

SENIOR DRAUGHTSMAN required having experience in design and manufacture of cable-making machinery.—Applications in writing stating age, technical qualifications, experience and salary required to Employment and Welfare Manager, Johnson and Phillips, Ltd., Charlton, S.E.7. (E 184)

SIGNALS ASSISTANT INSPECTORS OF POLICE (Supernumerary) required by the GOVERNMENT OF KENYA for one tour of two years with possible extension. Commencing salary, etc., according to previous experience in scale £767 rising to £1,092 a year. Gratuity (at least £162 after two years' service) payable on satisfactory final completion of service. Outfit allowance £30. Uniform allowance £10 a year. Free passages. Liberal leave on full salary. Candidates aged 20-30 should be at least 5 ft. 7½ ins. without footwear, have normal vision without glasses and be of good education. They should possess a sound knowledge of the installation and maintenance of modern low and medium powered V.H.F., static and mobile equipment, H/F transmitters and receivers, petrol generators and diesel electrical sets. Candidates with previous United Kingdom or Colonial police experience will be considered up to 35 years of age.—Write to the Crown Agents, 4 Millbank, London, S.W.1, stating age, name in block letters, whether married or single, full qualifications and experience and quote M1/32820/EE. (E 191)

THE ASSOCIATED ETHYL CO., LTD., Northwich, Cheshire, a company operating a number of chemical plants, have the following vacancies in the drawing office of their Engineering Department:—

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(b) ELECTRICAL DESIGN DRAUGHTSMAN.

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TRANSFORMER DESIGN ENGINEERS required. Applicants should have served a recognised apprenticeship and be qualified to H.N.C. standard. Drawing office and test experience would also be an advantage but are not essential. The conditions of employment are excellent, including a first-class non-contributory pension scheme, and the positions offer plenty of scope and opportunities of advancement to men with the required ability and initiative.—Please apply, with full details of training, experience, age, salary, etc., to The Personnel Dept., The Brush Electrical Engineering Co., Ltd., Loughborough, Leics. (E 148)

TRANSFORMER DESIGNER required in Lancashire for work on power transformers up to 10,000 kVA, 3 ph. 66,000 V. Applicants should have university degree and be Associate Members of the Institution of Electrical Engineers. The position holds good prospects for a keen, energetic man.—Please state age, experience and salary required, to Box No. 2709, Electrical Times. (E 149)

VACANCY occurs in Lincolnshire for ELECTRICAL DRAUGHTSMAN preferably with experience in the layout of control gear and diagrams. First-class working conditions. Canteen and recreational facilities.—Applications stating qualifications and experience to Box No. 2721, Electrical Times. (E 185)

W. T. GLOVERS of Trafford Park, Manchester, manufacturers of paper insulated cables up to the highest voltages, require a TECHNICAL ASSISTANT. Degree or H.N.C. standard desirable. Permanent position on the technical staff, which calls for dealing with specifications, current ratings and general technical matters for all voltages of cable. Five-day week. Age 22-30 years. Good prospects of promotion. Salary in accordance with qualifications and experience. (E 186)

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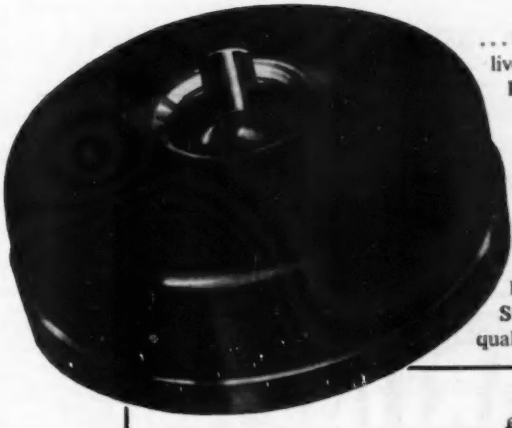

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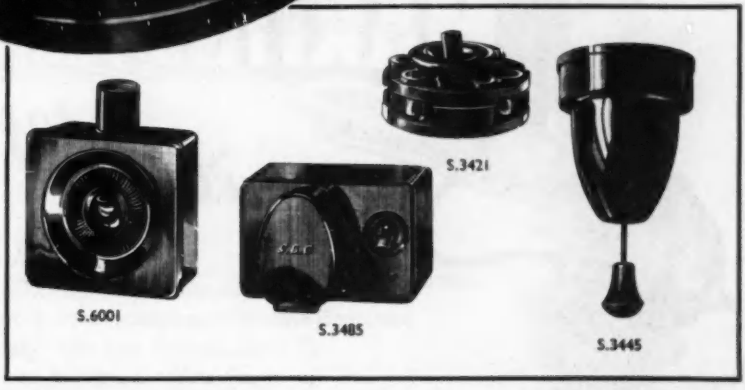

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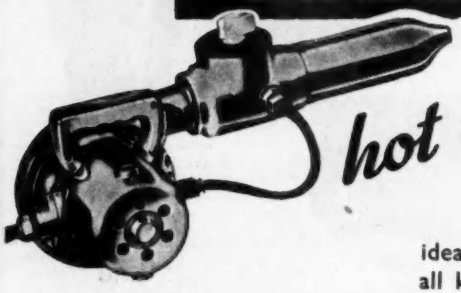

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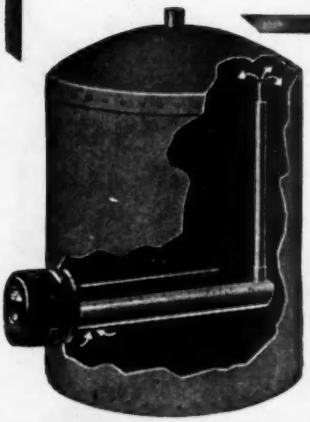

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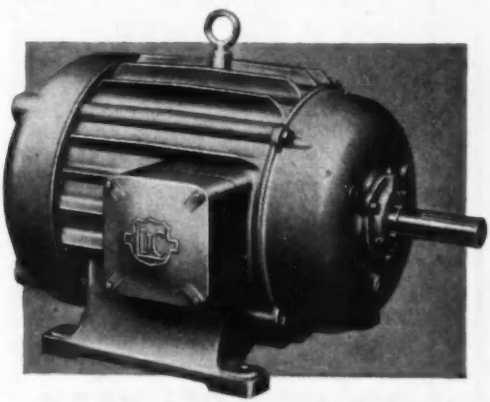

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The illustration shows a Mather & Platt pumping set for the oil industry. The 1,000 b.h.p. 1,480 r.m.p. squirrel cage motor is direct-on-started with a starting current 4 times full load. The duty of the 'Plurovane' pump is 1,400 gallons/min. against a 1,965 ft./ head.

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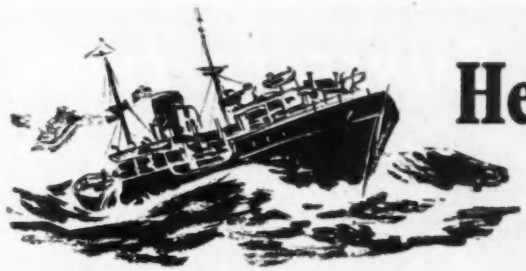

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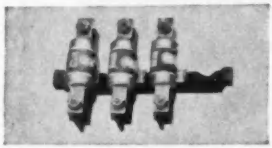
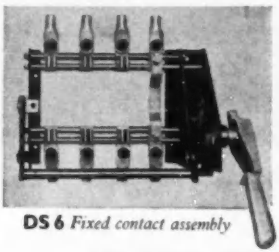


DS 6 *Moving contact—fuse assembly*



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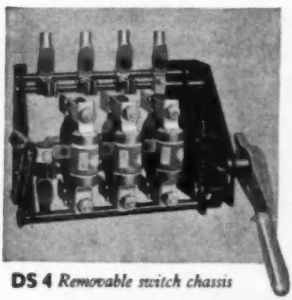
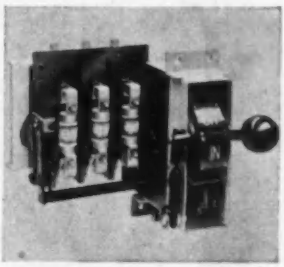


DS 4 *Removable switch chassis*

DS 2 *Complete 'H.I.' fuse switch*



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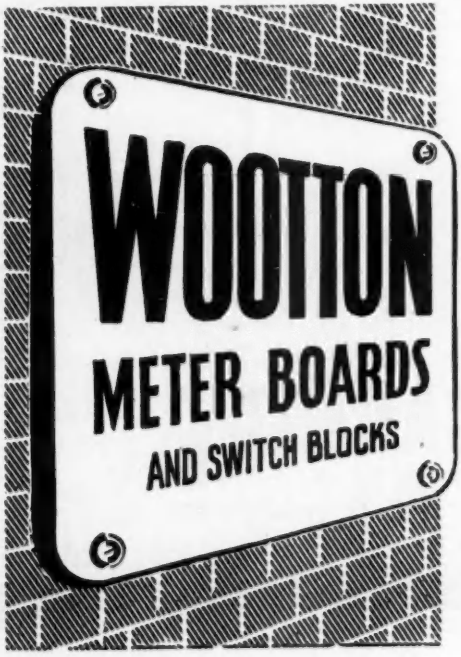

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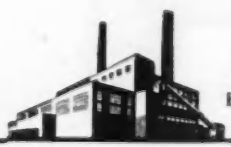
BRITISH  ELECTRICITY

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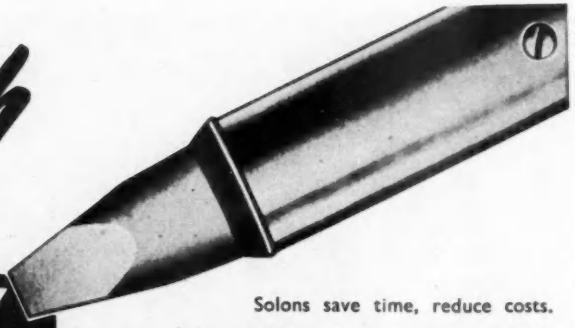

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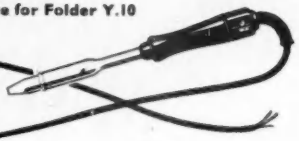

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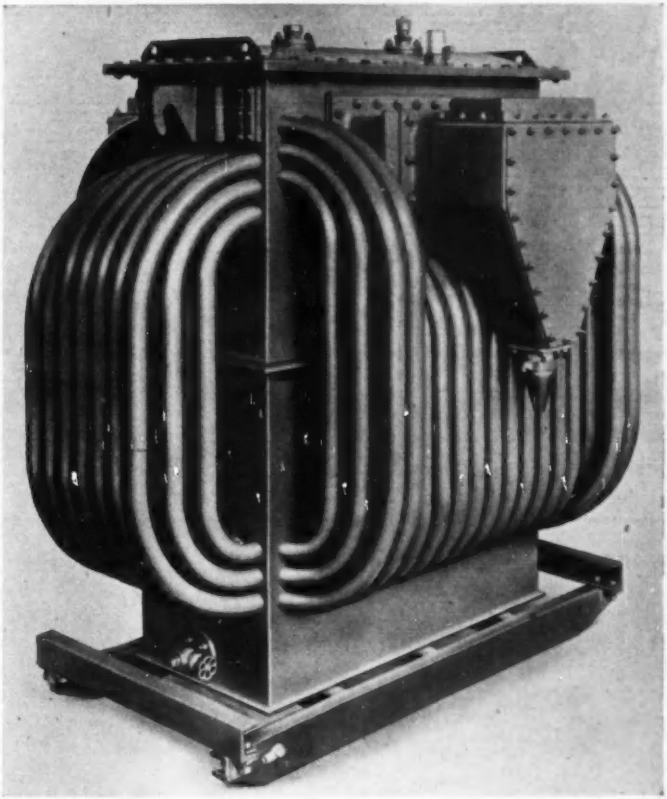

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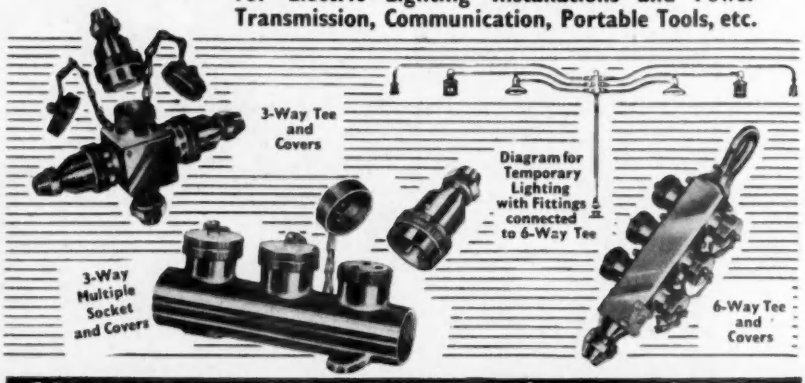
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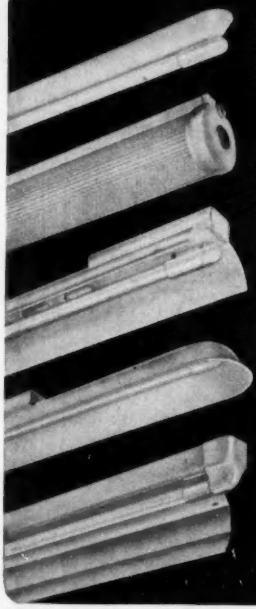

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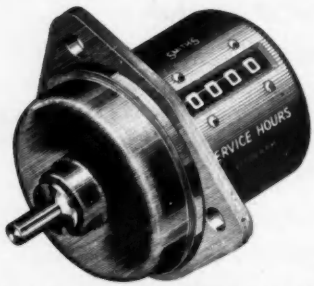

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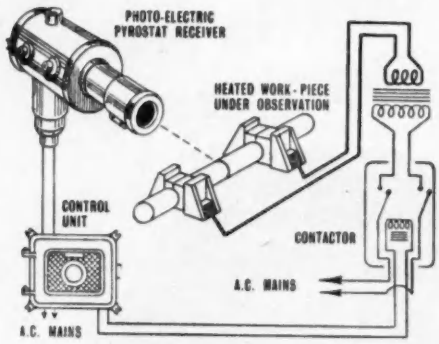

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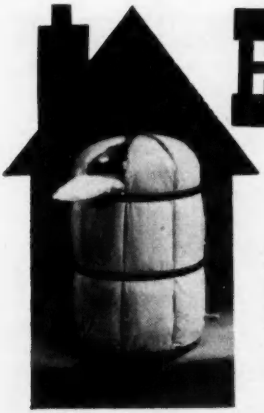

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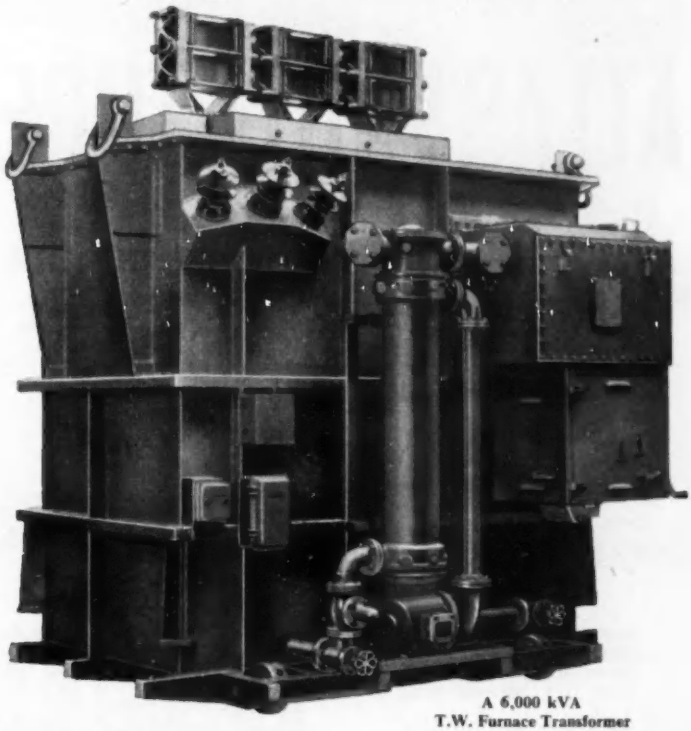

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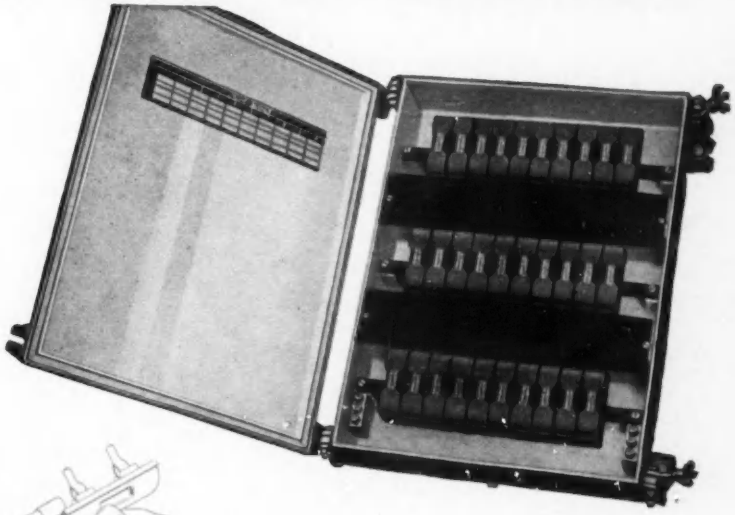

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